OCTOBER 1953/35 CENTS

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THE LEADING MAGAZINE OF AIR PROGRESS AND AEROMODELING

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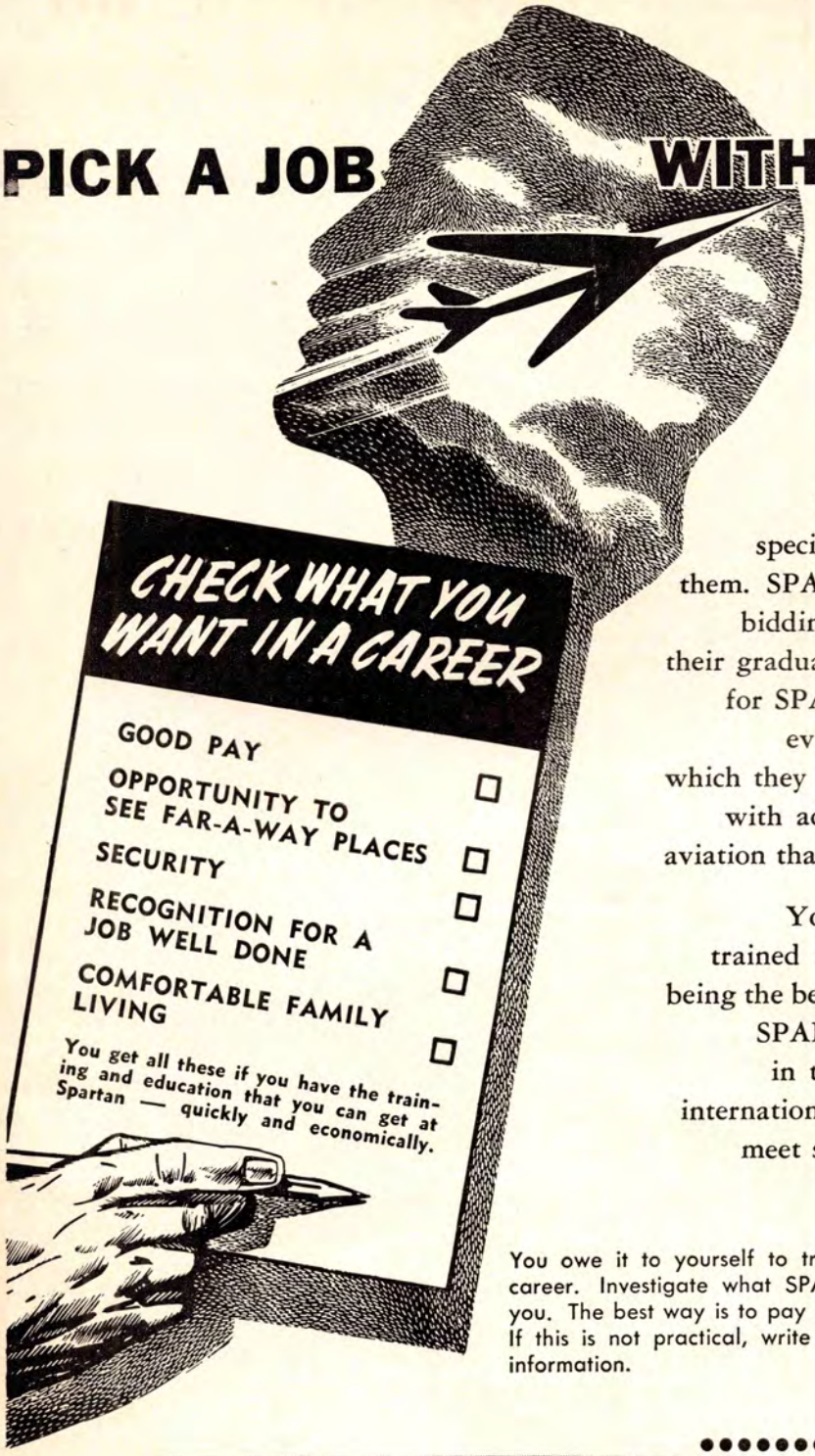

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Cover: McDonnell F3H-1 Demon twin-jet carrier fighters. Powered by two Westinghouse J-40 engines with afterburners. Now in production for the Navy. Capable of sonic speed.

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AIR TRAILS published monthly by Street & Smith Publications, Inc., at 575 Madison Ave., New York 22, N. Y. Entered as second class matter at the post office at New York, N. Y. Authorized as second class mail Post Office Dept., Ottawa, Canada. Copyright 1953 by Street & Smith Publications, Inc., in the United States and countries signatory to the Berne Convention and Pan American Convention. 35c per copy. This issue is Vol. XLI, No. 1. Please advise us if you move; allow four weeks for change of address. Give old and new address when notifying us. Subscription correspondence should be addressed to Subscription Dept., Street & Smith Publications, Inc., 304 E. 45th St., New York 17, N. Y. All characters used in fiction and semi-fiction stories in this magazine are fictitious. We cannot accept responsibility for unsolicited manuscripts or art work. All submissions must include return postage. Printed in [illegible]3 U.S.A.

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Kimball, Menne Co.
2550 Beverly Blvd., Los Angeles 4, Calif.
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FROM THE READER

Doctor Relaxes on Shoestring . . . Just finished building the model of Shoestring. I have put about 300 hours into this model, and the results are well worth it. I wish to thank your editors for a fine magazine.

James A. Anderson, M.D., Madison Clinic, Madison, S. D.

"DIID" . . . Please send me group Plan #853A consisting of "Combo Trainer" and the DIID aviation game (Detection-Identification-Interception-Destruction). Included is the check for amount prescribed, .35 in full payment for the above. You say that you would like to hear my opinion concerning whether such games should appear in further editions of "AT". My answer is *yes*, not only because they are instructive but because it is a very exciting game. The idea is one of the most original I have ever heard, especially the one of changing sides in the middle of the game so that the attacker becomes defender and vice-versa.

The "Combo Trainers" are for the development of a little air model club we are trying to start.

Leonardo Siller, Monterrey N.L., Mexico

. . . I, for one, would like very much to see such projects as "DIID" from time to time in A.T. I have just completed making the game and a more interesting one I have yet to play. Keep 'em comin'!

Curtis Collier, Ft. Bragg, N. C.

. . . I enjoyed "DIID" very much and would like to see more games like it in Air Trails.

D. Fischer, Normandy, Mo.

C.A.P.'s Canadian Cousin . . . I was especially interested in your recent columns on C.A.P. Cadet. I am 15 years old and I would like to bring your attention to a group in Canada similar to your C.A.P. cadets. This group has the name of "Royal Canadian Air Cadets." I am a corporal in this. The ages of most of cadets are between 15 and 18 although the youngest you can be is 14. We have scholarships in this group, *e. g.* "Aeronautical Engineering," "Flying Scholarship," etc. Since 1947 the Air Cadet League has spent over $42,600. We have exchange trips with Britain and U.S.A. and all in all it is a wonderful thing.

Corporal James S. Wilson
N. B., R. C. A .C.
Fairville, Can.

Why Not 2000, Joe? . . . Though I have had only a year's subscription and started to read your magazine in 1950, I wouldn't mind reading it until 1999.

Joseph Keyes, Gary, Ind.

• This, we gather, is a compliment.

Time and the Inclination . . . In a recent issue of Air Trails which I bought at the P.X. I was very much impressed with your Triple Threat Treat set of drawings of the F-51, Spitfire and Me-109. I'm a rather frustrated modeler, stationed here in England. I really miss the detail and precision that is taken for granted in most U. S. modeling, but is so lacking at least in this part of the U. K. It is possible to get material but kits are poor and most drawings I have seen, and that's not too many, are sorely lacking in accuracy and detail. I still have almost 2½ years to do over here and have both the time and inclination to build quite a few ships.

T/Sgt. M. D. Byrne, England

The Modeler's Ma
By Dorothy Kambestad

At Five I swept up balsa chips
At Ten I choked on dope.
At Twelve I dodged the indoor ships
Swift as an antelope.
And lest the landlord should say "GO!"
Yelled, "Cut that motor dead!"
Or, "Careful! Plaster's down below!"
(He heard no word I said.)

And now a duster is my lot.
I work preserving sheen—
Balsa, dope and noise forgot,
And oil and gasoline.
And when I hear those "Ah!"s and "Oh!"s
I'm proud to wear an apron.
A Rose, of course, is just a Rose,
But I'm a Hardware Patron!

The Case of the Missing Memory . . . Judging from the way our readers recall odd bits of aeronautical information to catch us in an occasional editorial boner, we'd say they rarely forget a thing. But once every so often Friend Reader himself slips on the ice. In a spirit of camaraderie, knowing that sheer weight of quantity or detail can make amnesia victims of us all, we submit the case history of Tom Henebry, as told in letters.

In May of this year we received a letter submitting certain modelplane photos,

(*Continued on page 8*)

All communications to the editors should be addressed to 304 East 45th St., New York 17, N. Y. **Subscription prices:** U. S. and Possessions—$3.50 per year, $6.00 for two years; Canada—$4.00 per year, $7.00 for two years; countries of the Pan American Union—$7.00 per year, $10.00 for two years; elsewhere—$10.00 per year, $14.00 for two years. **Please advise us if you move,** giving old address and new address; allow four weeks for change of address; address all subscription mail to **Air Trails Subscription Department,** 304 East 45th St., New York 17, N. Y.

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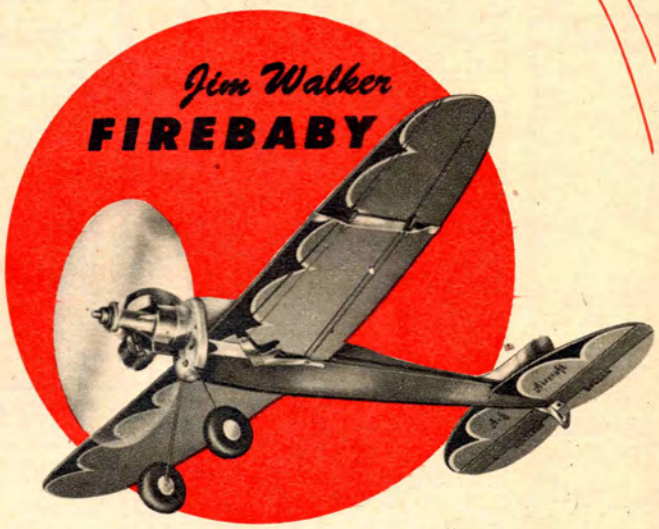

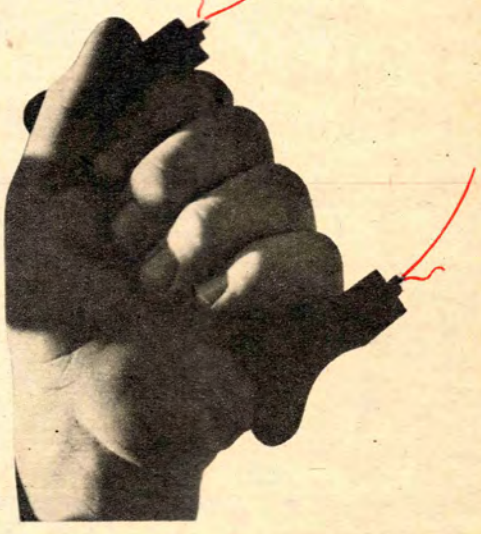

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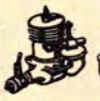

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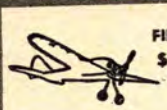

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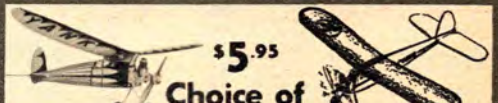

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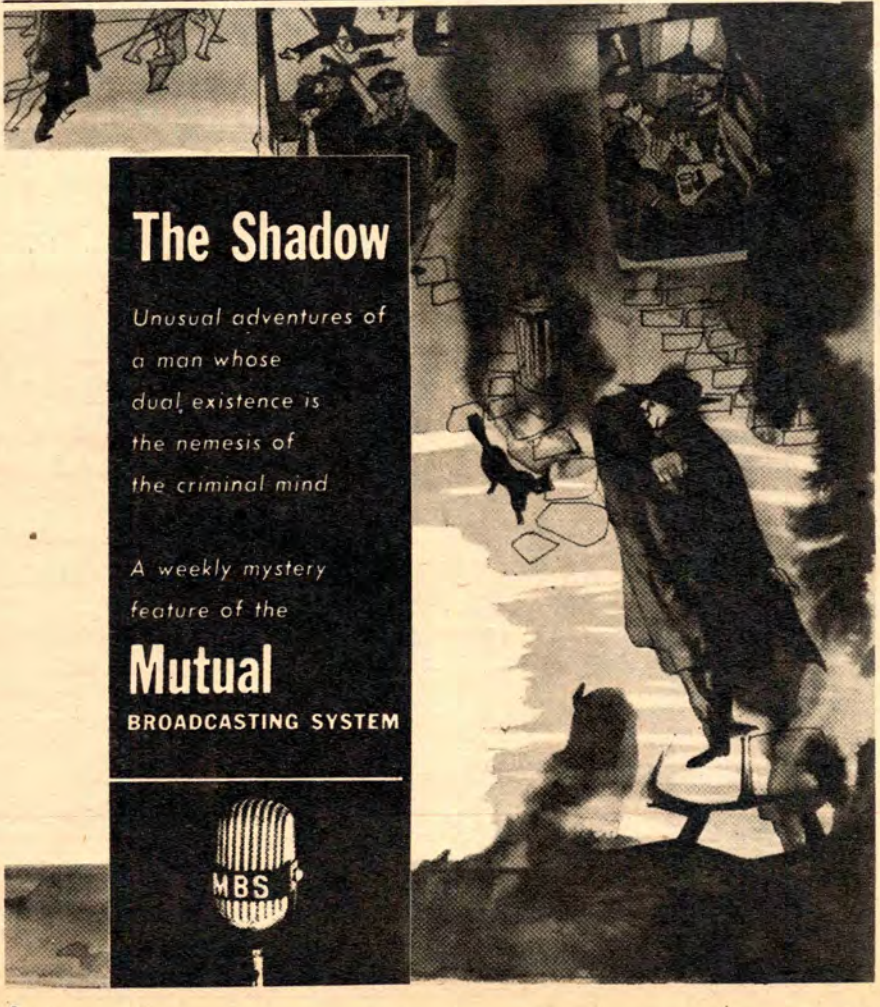
The Shadow
Unusual adventures of a man whose dual existence is the nemesis of the criminal mind
A weekly mystery feature of the
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Letters

(Continued from page 4)

signed by "Tom Henebry", living at an address on Oaklawn Ave., in Chula Vista, Calif. At the same time Rose Borello, our very competent Assistant to the Editor, was about to mail a $5 check to Thomas H. Henebry, Aviation Chief Metalsmith, USN, stationed at Patuxent River, Md. The check was for an idea submitted to our "Sketchbook" department in 1949 but not used till recently because of misplacement of sketch due to office moving during the intervening years. With handwriting and model background identical, Rose naturally assumed the same man had made both submissions, and sent the check for the Sketchbook idea to the newer address in California. Back came the following letter, dated June 19:

Enclosed please find a check for $5 mailed to me by mistake. I don't recall submitting any such idea, it is undoubtedly an error. Tempting as it is to pick up an extra "fin," I feel I should return it.

Tom Henebry

Rose sat down at her typewriter and wrote him thusly:

Are you an ex-Navy man who was stationed at Patuxent River, Maryland, back in October 1949? If so, our check for $5.00 for "Idea for Storing Filtered Fuel" belongs to you. Please let us know by return mail whether or not you were in Maryland at that time.

His reply was by return mail, dated June 25:

I'm forced to admit that I am the same Navy man that was stationed in Patuxent River in Oct. '49. I also have a vague recollection of the suggestion in question. I submitted quite a few around that time and had completely forgotten that one.

I feel a little stupid about not remembering, but I wouldn't enjoy the five-spot if I wasn't sure I rated it. Sorry if it caused you any inconvenience.

Tom Henebry, AMC U. S. Navy

And so it was not necessary for the Assistant to the Editor to take the embarrassing step of playing her ace—sending Tom a copy of the following letter from our files received October 11, 1949:

Enclosed find a sketched hint for your "Sketchbook" department.

To fuel my Baby Spitfire engine, I use a hypodermic syringe. The thin needle point makes fueling through the very small filter opening very simple. It's also useful for priming through the ports, it puts a drop of fuel exactly where you want it.

I put filtered fuel in small-necked 1 or 2 oz. bottles and cover the neck of the bottle with a "puncture sealing" type of rubber cap (the type doctors use on small vials of penicillin). These caps are available at all drug supply houses and may be used many times before leakage occurs.

When fuel is needed, instead of removing the cap on a can of fuel, allowing ever-present dust and foreign particles to enter, you simply grab one of the sealed, filtered bottles of fuel and poke the hypodermic needle through the center of it, draw out the amount you need, remove the needle and the puncture seals itself, leaving the fuel remaining still clean and unexposed to dirt, etc.

Thomas H. Henebry, Aviation Chief Metalsmith, USN, Patuxent River, Md.

"Was that a dethermalizer, mister?"

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AT-10

Just a flight at twilight. Nice "atmosphere" shot by J. Richards of Edward Mahler, Brooklyn Skyscrapers, launching Civvy Boy 74. This at the NYC Aeronuts meet, Hicksville, L. I.

TOP FLITE CONTEST OFFERS NOVICE AWARDS

■ Something new in contest awards is offered by Top Flite Models—prizes for contest directors! It's all a part of the $1,000 National Flying Contest for longest durations racked up with Jigtime rubber-powered jobs or sling-launched gliders.

First-place awards of $200 in the senior division (over 16) and $150 in Junior, plus trophies, indicate the type of awards to be handed out. The flight reports must be postmarked not later than Sept. 30, so you'll have to work fast.

Official flights may be made at meets organized by contest directors or leader members of the Academy of Model Aeronautics, hobby store owners, Scout leaders, Y.M.C.A., or church youth leaders, teachers, club leaders, or the like.

Your local hobby shop owner should have all the necessary information about the contest. If he doesn't, ask him to write air mail to Top Flite in Chicago.

Airfoil Info. To determine what significant shifts there may have occurred in airfoils recently, Air Trails has enlisted the services of Frank Zaic to direct "Operations Airfoil." Frank is sending

Ah, the familiar sight. Police car—so well known to many of us—investigating those #&%$! model flyers and finding out they're a pretty nice bunch of lads. Outcome—the flying goes on.

questionnaires out across the country to hundreds of design experts, but, of course, he won't be able to contact everybody. So we publicize his queries here—perhaps you have some data of interest.

AIRFOIL QUESTIONNAIRE

Purpose—to determine type of airfoils now in practical use. Give as much information as you can from your actual experience.

(1) Name.....
(2) Address.....

Please supply data under headings for airfoils now in use.

(3) Airfoil name or No.....
(4) Type of model.....
(5) Length of model.....
(6) Wing span.....
(7) Wing area.....
(8) Stab area.....
(9) Weight.....
(10) C.G. Position.....

(Repeat 3 through 10 for each airfoil)

(11) How long have you been using the above airfoil (s)?.....
(12) What did you use before?.....
(13) What made you change?.....
(14) What difference have you found between the airfoils in flight (power and glide)?.....
(15) Have you found that various types of wing construction made differences in flight?.....
(16) What airfoils would you like to try next and why?.....
(17) If you are using your own airfoil, please attach an acurate outline.....

This query form is merely a sample. Questions are numbered so you can supply your answers on a large (8½x11") sheet of paper. Just place a corresponding number on answer; no need to copy question.

Send along your answers to Frank Zaic's Operation Airfoil, c/o Air Trails, 304 East 45th Street, New York 17, N. Y.

Pendulum rudder and elevator controls are features on this free flight scale French Bebe Jodel D-9 built by 15-year-old John Sparnicht of Hempstead, N. Y. Inverted Wasp, 34" span.

Cheers for Navy. If you've been following this column you know that the services are doing a pretty big job for the model builder—both those in uniform and in civvies. The Navy is host to the annual National competition and the Air Force has its World-Wide and Conference-wide air-model championships. But down on the "local" level—that's where we like to see the services get active.

Apparently that's what you can expect at the Naval Air Technical Training Center at Norman, Okla., from now on. Early in August the Varsity Book Store and Sooner Hobbies Center in Norman teamed up to sponsor a contest open to all, but with special (*Continued on page* 75)

One thing we know, AMA 19480 is well hatted. This job is complete with pilot, prop, wings and empennage. Big question is—control line or free flight? Does brim contribute to lift?

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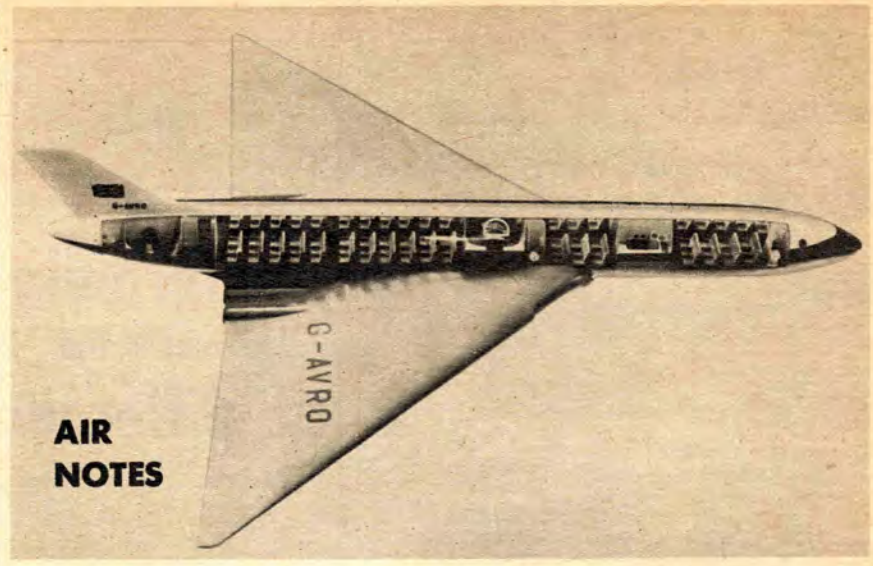

AIR NOTES

Delta Wing Airliner Next Step in Super Fast Transport

■ THE BRITISH having scooped the air transport field with the first jet airliner are now working on the next step in fast aerial travel, a delta wing transport. Still in design stage at Avro, the Atlantic, as the plane has been named, will be capable of carrying from 76 to 131 passengers, fly non-stop from London to New York in seven hours at an altitude of over 40,000 ft. Speed will be better than 600 mph. . . . NEW SPEED RECORD of 715 mph was established by USAF pilot Lt. Col. William F. Barnes at Thermal, Calif. in North American F-86D. . . . FIRST F-84F Thunderstreak jet fighter built by Buick-Oldsmobile-Pontiac division of General Motors flown at Fairfax Field, Kansas. . . . ALL WOMEN Transcontinental Air Race from Lawrence, Massachusetts, to Long Beach, Calif., won by Frances Bera and Marcella Duke flying a Stinson.

★ ★ ★

FORTY-TWO U. S. air lines named winners of National Safety Award for 1952. . . . REPUBLIC AVIATION has formed a subsidiary company in Europe, Republic Aviation International, to subcontract with European firms for the production of spare parts for F-84 and F-84F fighter bombers being supplied to NATO nations. . . . SWEDISH 700 mph all-weather jet attack plane, the SAAB A-32 Lansen in full production, will be standard equipment of Swedish AF's twelve specialized attack squadrons. . . . TEMCO's contract to build McDonnell F3H Demon cancelled by U.S. Navy, Bureau of Aeronautics. . . . SIXTEEN-YEAR-OLD Donald R. Monaco of Hartford, Conn., soloed Piper Tri-Pacer in less than three hours. . . . SEDATE Port of New York Authority jarred by invasion of motorless aircraft. Soaring silently from Elmira, N. Y., some 190 miles distant, as part of the 20th National Soaring Contest, three sailplanes landed at New York's Idlewild airport; fourth, piloted by woman champion Betsy Woodward set down at Teterboro, New Jersey field. . . . BOEING pleased with performance of Pratt & Whitney J-57 jet engines in B-52 Stratofortress. "It's the best brand-new engine we've had in any experimental airplane," Boeing engineers said in their performance report.

AIR FRANCE took delivery of its first Lockheed Super Constellation powered by Wright turbo-compound engines. Nine more to come. KLM Royal Dutch Airlines accepted the second of thirteen on order.

★ ★ ★

LINK AVIATION received contract to develop flight simulator for Convair F-102 delta wing interceptor. . . . IN 75 day period, Air Force F-86's in Korea shot down 143 Communist MiG-15's with a loss of only one Sabre. Feat unparalleled in history of aerial warfare. . . . HARMON INTERNATIONAL AVIATION AWARD, for world's outstanding aviatrix, aviator and aeronaut (lighter than air pilot) presented to Col. Bernt Balchen for his Arctic achievements, to Mme. Jacqueline Auriol as first woman to a fly jet plane and to Walter Massic, civilian test pilot, for carrying out all test flights of largest non-rigid airship in world, Navy's N-1.

★ ★ ★

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★ ★ ★

ITALIAN AIR FORCE to receive Fairchild C-119 Boxcars. Two of the planes have already been delivered and assigned to Fourth Wing of the IAF. . . . NORTH AMERICAN AIRLINES of Burbank, Calif., first U.S. commercial air transport outfit to use backward-facing seats. First plane to be fitted was a Douglas DC-4. Similar seating will be used in DC-6Bs now on order.

★ ★ ★

FOR THOSE interested in aviation and lives of great Americans, highly recommended is the book "The Amazing Mr. Doolittle," by Quentin Reynolds (Appleton-Century-Crofts Inc. $3.95). Fascinating record of the man who personally led a flight of medium bombers on the first raid on Tokyo and who in a large way was responsible for such advances as blind flying, 100 octane aviation gasoline and many other developments in aviation. A great book about a great guy. . . . FOR YOUNG LADIES interested in becoming Air Hostesses, Bell Publishing Co., Box 172, Cambridge 38, Mass. has a booklet called "Air Hostess," by Jack Stark. Gives full information on this career. Price of this one is $1.00.

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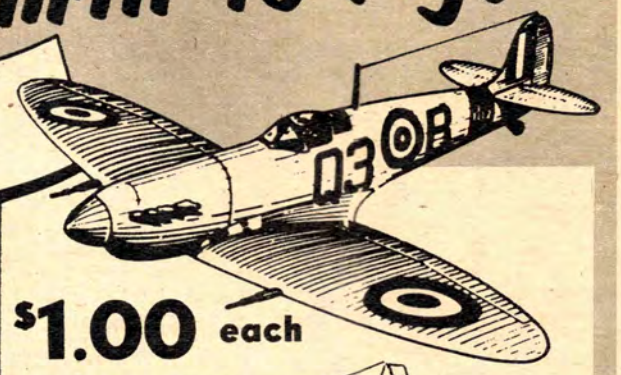

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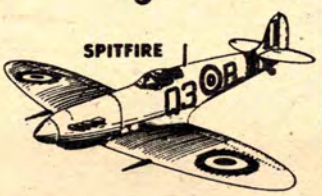
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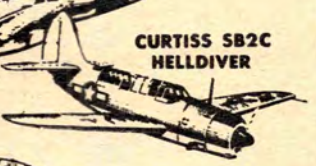
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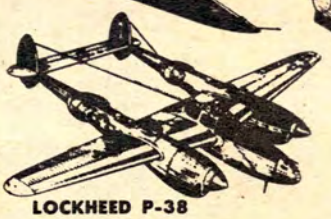
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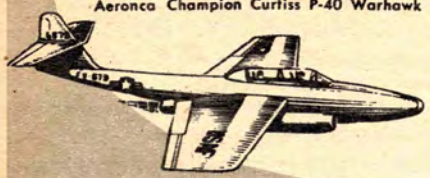
McDonnell F2H-1 Banshee

25¢ and 50¢ kits have plastic canopy and prop disc.



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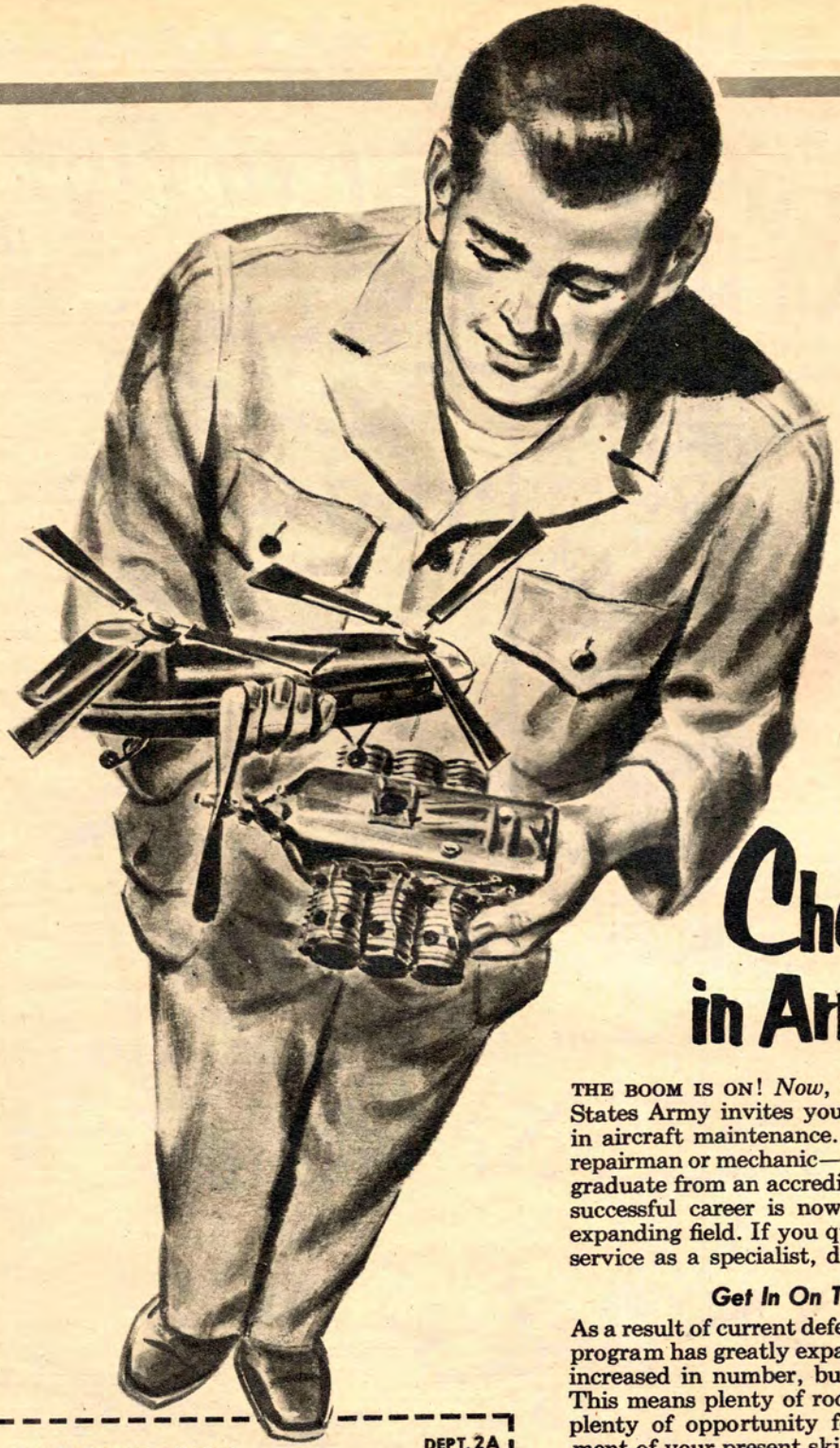

Aircraft repairmen and mechanics

Choose your job in Army Aviation

THE BOOM IS ON! *Now*, for the *first* time, the United States Army invites you to enlist *directly* for top jobs in aircraft maintenance. If you are a certified aircraft repairman or mechanic—or if you are a student about to graduate from an accredited civilian aviation school—a successful career is now open to you in this rapidly expanding field. If you qualify, you'll begin your Army service as a specialist, doing the work of your choice.

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As a result of current defense needs, the Army's aviation program has greatly expanded. Not only have its planes increased in number, but also in size and complexity. This means plenty of room for you at the top . . . and plenty of opportunity for the practice and improvement of your present skills!

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Helicopter Mechanic · Airframe Repairman
Rotor and Propeller Repairman · Airplane and Powertrain Repairman
Aircraft Instrument and Electrical Systems Repairman

DON'T DELAY! There is a fine aviation slot waiting for *you* in today's modern Army. Find out about it from your local Army recruiter, or fill out this coupon today!

DEPT. 2A

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Department of the Army, Washington 25, D.C.
ATTN: AGSN-M

Please send me further information on my opportunities in the Army's Aviation Maintenance program:

Name_____ Age_____

Address_____

City_____ Zone_____ State_____

Specialty_____ Experience_____

(If student, fill out following)

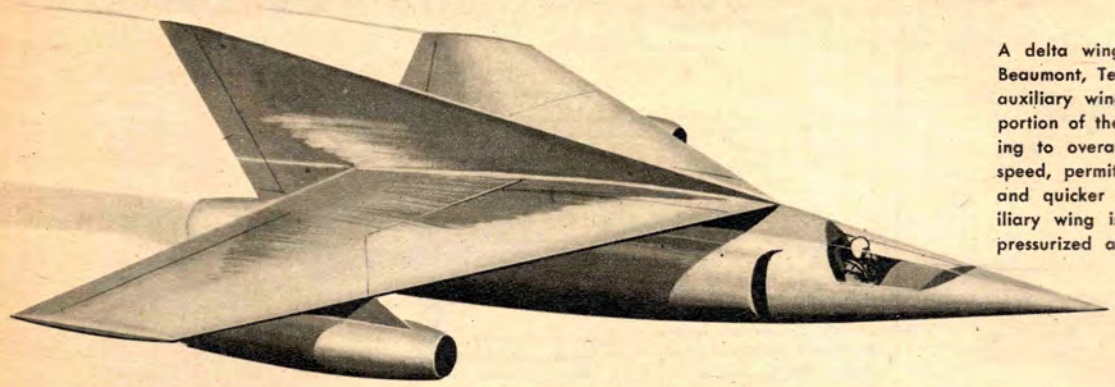
School_____

Subject_____

Date of graduation_____

1ST AWARD

Slip-wing delta high-altitude fighter

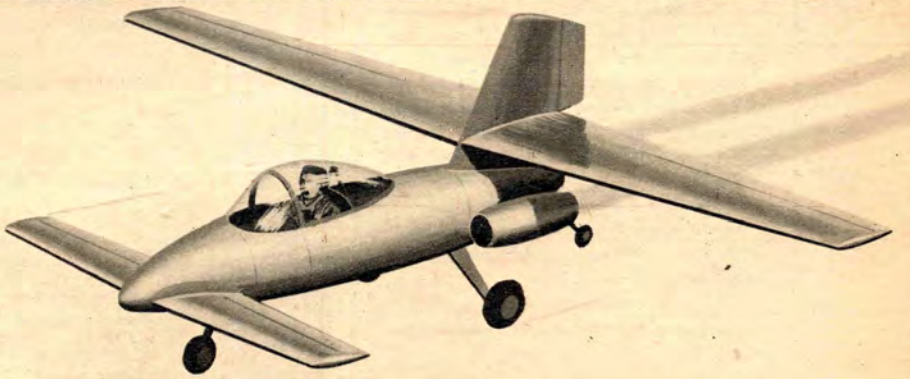


A delta wing jet fighter by George Talbert of Beaumont, Texas. The plane is equipped with an auxiliary wing which swings out of the forward portion of the main supporting surface, thus adding to overall wing area and reducing stalling speed, permitting plane to make slower landing and quicker take-offs. For high speed, the auxiliary wing is retracted. The plane has a fully pressurized and air-conditioned cockpit. Powered by a 6000-lb. thrust turbojet and two ramjets at wingtips, it is capable of speeds in neighborhood of 850 mph. Has ceiling of 75,000 ft.

2ND AWARD

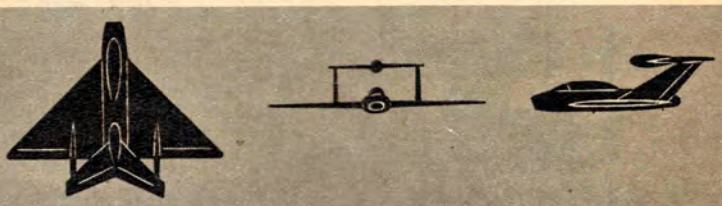
Light jet-powered canard sport plane

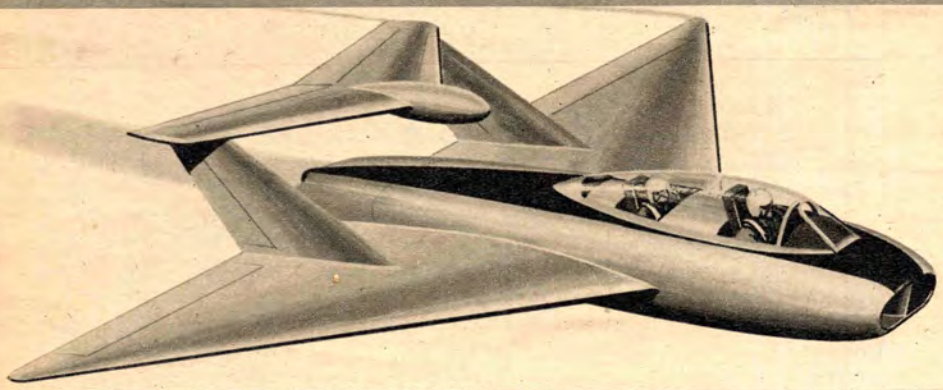
An unusual single-place sportplane by Samuel N. Reighard of Evans City, Pa. Original design somewhat altered by our technical staff by lowering main wing and relocating powerplants. Engines: two 200 lb. thrust turbojets. Designer claims unusually short take-off of only 80 ft. run and ability to maintain flight at speed as low as 50 mph. Cruising speed is 120 mph, top speed 160 mph. Construction is all metal, tail surfaces, ailerons and flaps fabric covered. Landing gear swivels, permitting cross-wind landing. Auxiliary tip tanks can be fitted for extra range in case that is desired.



3RD AWARD

Radar-equipped delta wing jet fighter

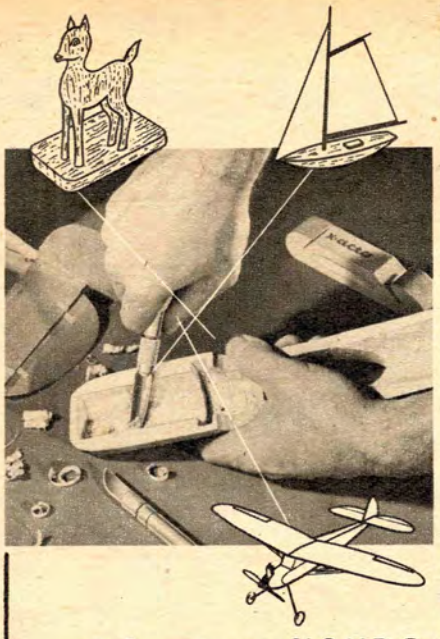




An all-weather fighter by Wayne Moore of Grand Prairie, Texas. Quite interesting is the location of the horizontal tail, atop the two rudders, with radome in center of stabilizer. This permits a good unobstructed nose air intake for the two 7200 lb. thrust engines. Crew consists of pilot and radar operator seated in large-canopied, fully pressurized cockpit. Armament is six cal. .50 machine guns and rockets. Wingspan is 42 ft. 6 in., length 37 ft. 5 in.; maximum speed of this fighter is in excess of 700 miles per hour.

AIRMEN OF VISION DESIGN COMPETITION

Rules governing the "aircraft of the future" competition are as follows: Three-view sketches of the proposed aircraft will be required. These should be not less than 8½x11 inches for the entire three views. Give sketches of the complete airplane in three-quarter front and rear positions. Photos of a model of proposed design may be included. Information on the power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling of the entrant will be welcomed by the editors and judges. The design may be of any type: commercial aircraft, military planes, (fighters, bombers, troop transports), planes for the private flyer and single-engine sporting or racing craft. The entry each month judged the most practical or of the greatest significance will receive an award of $25. Payment of $5 will go to runners-up. Entries will not be returned and for that reason those participating should keep copies of all material submitted. Mail entries to Airmen of Vision, c/o Air Trails, 304 E. 45th St., New York 17, N. Y. Editors regret that due to large number of entries they cannot enter into any correspondence on Airmen of Vision.



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Air FORECAST and REVIEW

FRENCH PROTOTYPES: Forecast by models in the 20th Salon Aeronautique, here's what to watch for during the next few months:

(1) Interceptor by Dassault, possibly prone-pilot delta-winged job with Armstrong Siddeley Viper turbojet.

(2) Trainer by SIPA, tandem seater, with wing root inlets feeding the turbojet which exhausts under the fuselage.

(3) Interceptor by SNCASE, the Durandal, a lightweight delta-winged job for 1955 flight date. Speed: Mach 1.4.

(4) Fighter by SFECMAS, delta-winged, supersonic, model No. 1402.

(5) Copter by SNCASE, the Helibus, twin-rotor craft for 30 passengers.

NEW DESIGNS: Results should be in by now on design competition for a low-level strategic bomber, and a jet tactical bomber. Favored: Douglas and Martin. Question: Why low-level for strategic bombing? . . . McDonnell XF-88B (above), deep in test program to evaluate turboprop ground attack planes, can test 27 different combinations of propeller speed, diameter and number of blades. Development job will be split with Republic's F-84H modification soon to go on flight status. . . . Lockheed F-104 is reported by West Coast to have 28-ft. span, thin swept wings and negative dihedral, but others say Lockheed will stick to straight-wing layouts. . . . Rigel is Grumman missile for Navy, named after star-like Vought Regulus. Task: surface-to-surface bombardment. Rigel is ramjet powered, has been tested on ground at Marquardt, flown in dummy rounds at missile centers. . . . French guided missile for use by soldiers weighs 30 lb., has 200 mph top, kills tanks.

COMET FOLLOW-UP: During this year, BOAC will pick its successor to the unbuilt DH Comet 3. The choice is among: *Vickers-Armstrong VC-7,* possibly to be favored because of the firm's current work on the V-1000 transport for the RAF; the *Avro Atlantic,* delta-winged layout for 94 passengers; *Handley Page 97,* crescent-winged civil version of firm's bomber; *de Havilland,* with no name for its design. Drawback: BOAC has to make choice based on design claims only, has no hopes of getting flying models before 1956. Only one can be built because of financial picture; companies won't risk prototype construction without promises for orders. So BOAC has to gamble everything on one throw of dice. If they lose, there goes their jet lead, possibly for all time.

CURRENT CATCHPHRASE: WEAPONS SYSTEM. You'll hear more and more of this one. It says—basically—that there's lots more to armament than guns and bombs, gunsights and bombsights.

System's concept recognizes that everything that makes airplane a superior weapon has to be designed as integral piece of overall job, says in effect that you don't pick components off shelf and install in completed airframe. You start with job to do, figure out best way to do it, and then design everything to accomplish that job.

Extreme example: pilot clothing. If it's uncomfortable, pilot will fidget, may flub gunnery runs.

Watch for revival of old argument of machine guns versus cannon in this new concept. To a system engineer, either can be better, depending on job.

JET NOISE can be cut, say British, and you do it with teeth around the tailpipe. Ring of extensions around tailpipe exit—making it look fringed—is latest gimmick proven by Rolls-Royce tests.—*DAA*

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"Finishing School" for USAF Pilots

It's a far cry from the "test 'em till the wings come off" boys of yesterday to the scientifically trained pilots of an atomic age

■ During the early morning hours high over the California Desert, a pilot pulls back on the controls of a World War II B-25, putting the light bomber into a steep turn. A motion picture camera set behind the pilot records the aircraft's instrument readings while he brings the plane to accelerated stall. This is not the first time he or other pilots have performed this maneuver. It has been a required operation of a select group of pilots for the past ten years. These pilots are the students attending the U. S. Air Force's Experimental Flight Test Pilot School.

This USAF school is located at the Flight Test Center, Edwards AFB, Calif., one of nine research, development and testing centers of the Air Force's Air Research and Development Command. The School is designed to maintain the Air Force's capability for experimental flight testing at the high level of proficiency required for successful development of new USAF aircraft.

In the past, the training of experimental flight test pilots was an additional function of the Flight Test Center to provide capable test pilots from within the Air Research and Development Command. Now, however, this function has been converted into a USAF school and is open to all Air Force pilots who qualify. The current class started training in July.

This school is the only one of its type in the U. S. Air Force and one of five such schools in the world. Other schools are operated by the U. S. Navy, England, France and Russia. The Air Force's beginning student is a skilled pilot; when he graduates he is fully prepared to become a skilled test pilot in aircraft types ranging from helicopters and small liaison planes to heavy jet bombers.

Entrance requirements for the school are high. An applicant is normally required to have the equivalent of two years of college in engineering. A degree in engineering is highly desirable.

He must have a minimum of 1500 hours of diversified flying time, and can be any rank from second lieutenant to major. If a pilot has an exceptional record it is possible that the other requirements may be waived by a board of officers.

The subjects taught in the school include algebra, properties of the atmosphere, performance aerodynamics, theoretical aerodynamics, slide rule and calculator operations, conventional engine performance (theoretical and practical), trigonometry, physics, applied mechanics, thermodynamics, calculus, jet engine performance (theoretical and practical), report writing, supersonic aerodynamics, kinetic theory of gases, British flight test methods, weight and balance, longitudinal stability, lateral-directional stability, and stability flight test methods. The classroom work of the school is balanced by approximately thirty to thirty-five flight hours of performance evaluation in the T-28 and F-80, and thirty-five to forty hours completing stability problems in the B-25.

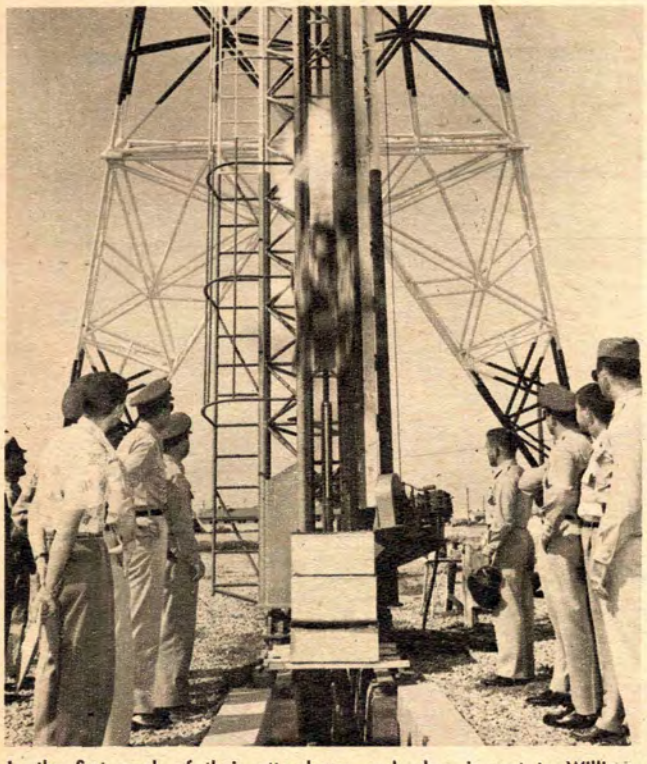
"FINISHING SCHOOL" FOR USAF PILOTS

Not all the would-be test pilot's time is spent flying airplanes. Classroom work is important. Here is stability, control class in session.

C.O. of Flight Test Center, Maj. John R. Amann of Brooklyn, N. Y. (left) flies as many missions with students as instructors. He's shown in a B-45.

Airplanes, men and equipment required to put a student through the school. It includes three airplanes, B-25 top, F-80 left, and T-28 right, two ground instructors, three flight instructors, text books, cameras, film and film reading equipment and flight gear. School was formerly at Wright Field. Around 400 students attended school since 1943. There are four classes per year. In each class is usually one RCAF test pilot.

Variety of types are tested by graduate pilots of Flight Test Center. Many are special research airplanes capable of exceeding speed of sound. Shown are some of the leading USAF test pilot graduates of school. At left is Maj. Charles "Chuck" Yaeger, first man to fly faster than sound. Aircraft are (left to right, bottom to top): X-4, X-92A, T-28, F-80, F-84F, F-86D, F-89, F-94C, B-47, B-45, XC-97 and B-36.



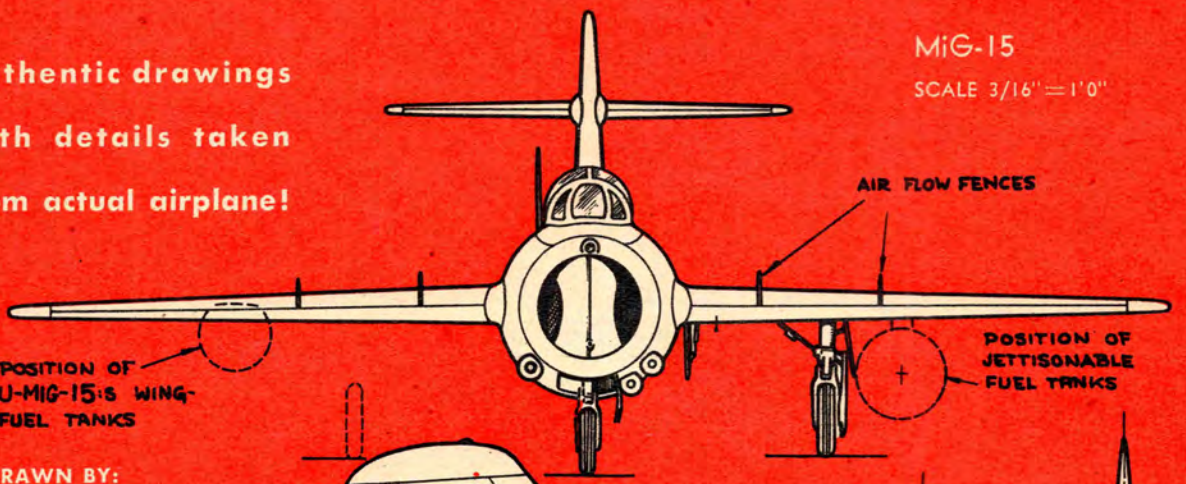
In the first week of their attendance each class is sent to Williams AFB Ariz., to undergo altitude and ejection seat indoctrination. Here students watch as one of the class gets a ride in ejection seat.

Under the night lamp, Capt. Wm. S. Ross, a student at the school, evaluates data collected during a typical test flight. Knowledge of mathematics and certain engineering background are important.

COMPLETE DETAILS ON RUSSIA'S MOST FAMOUS FIGHTER

Authentic drawings with details taken from actual airplane!

MiG-15
SCALE 3/16" = 1'0"



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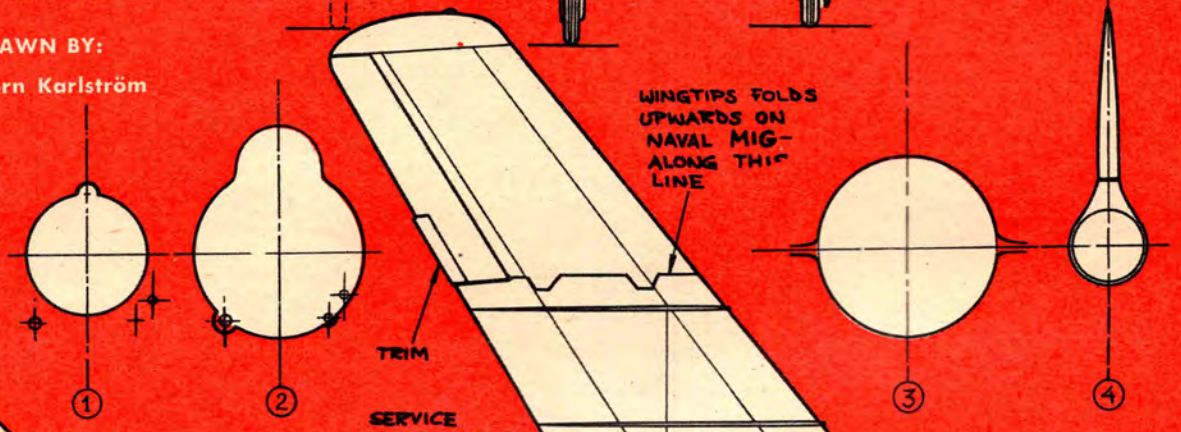
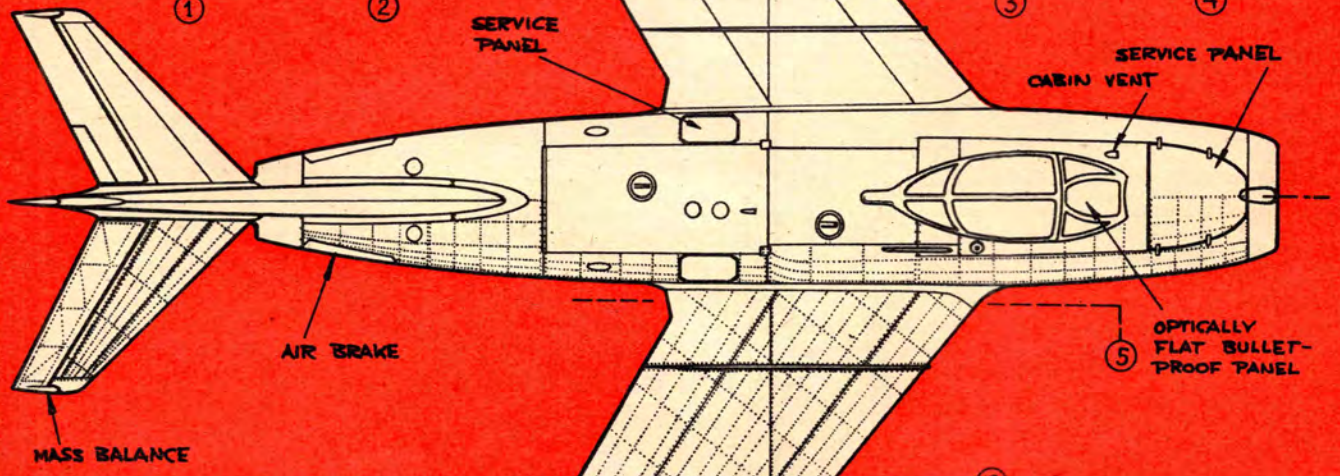
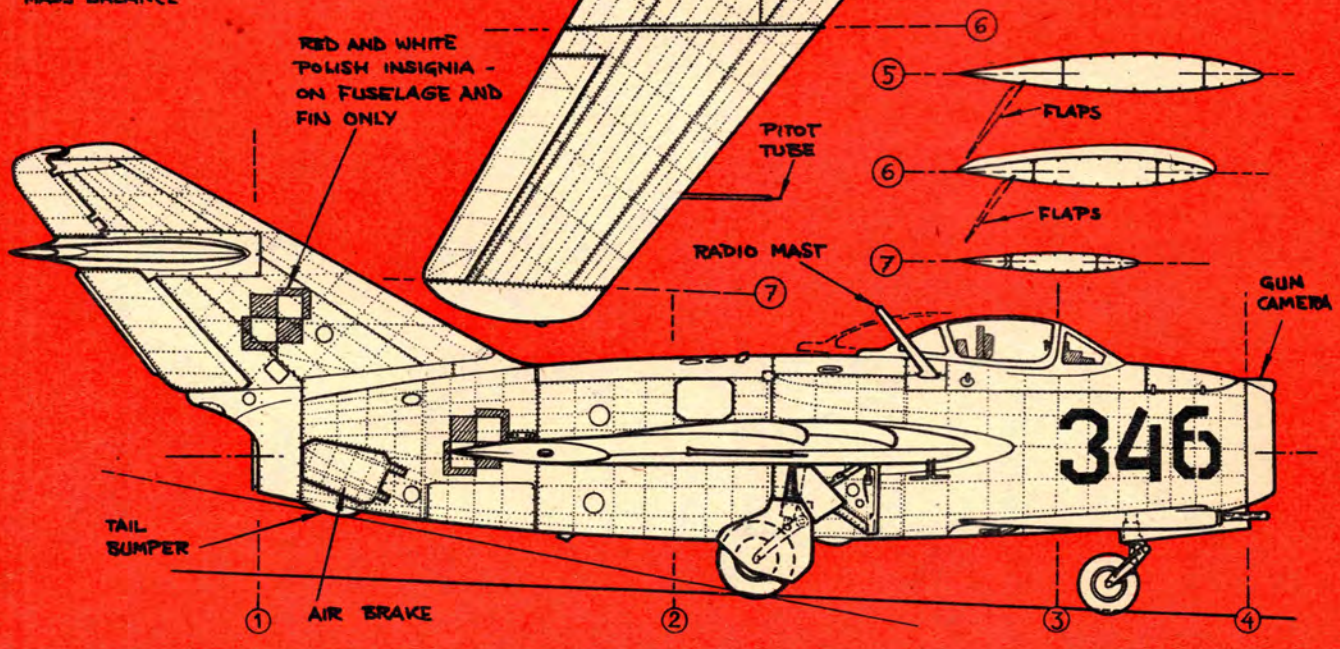
Björn Karlström



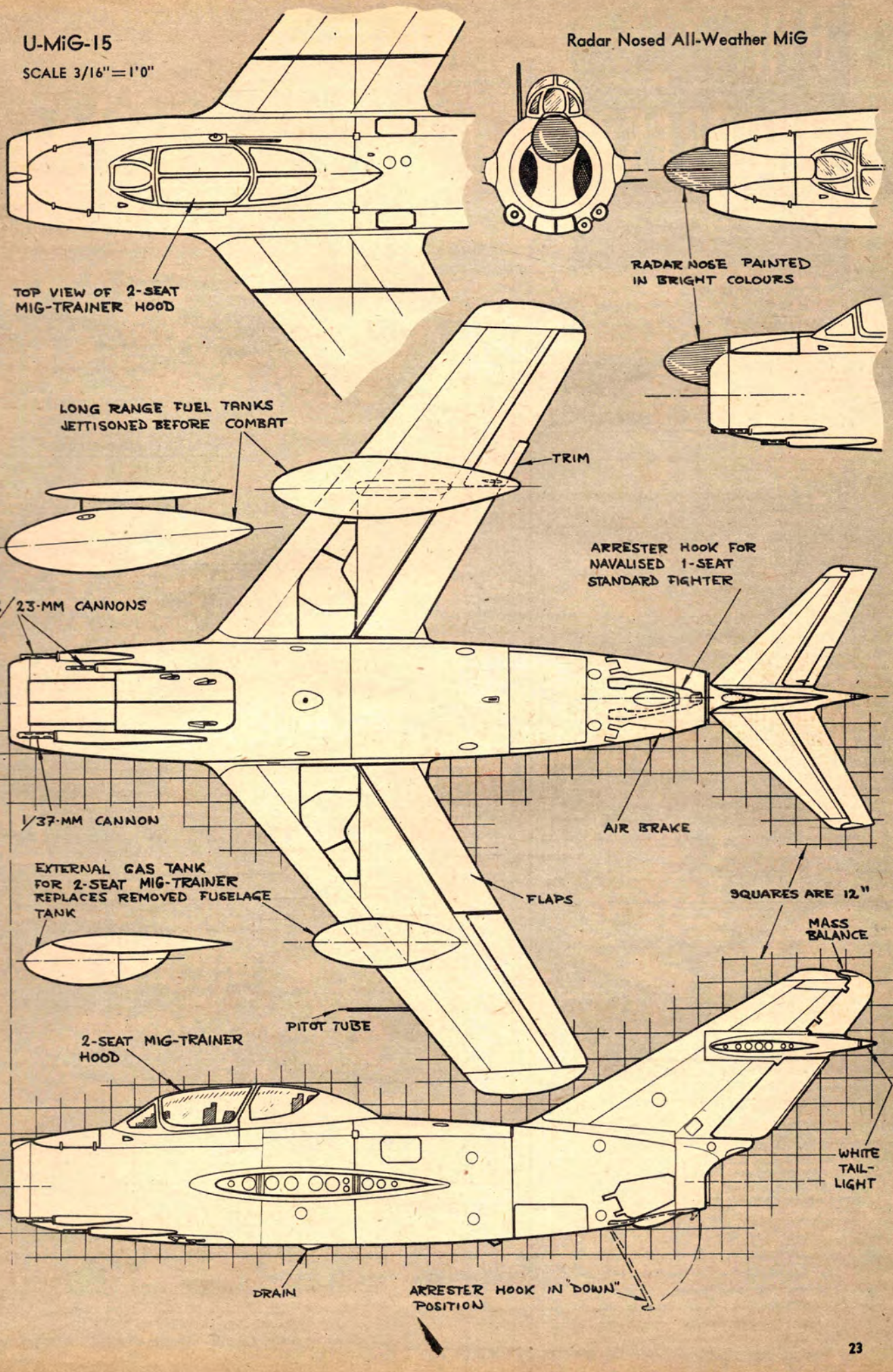




U-MiG-15

SCALE 3/16"=1'0"

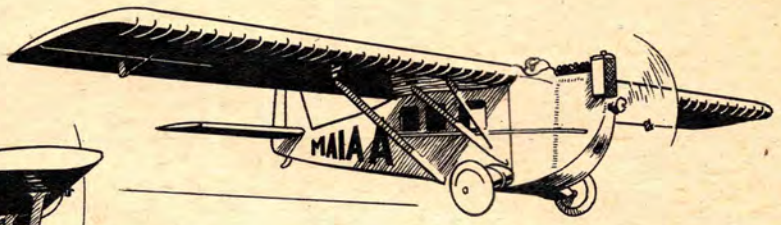
Radar Nosed All-Weather MiG



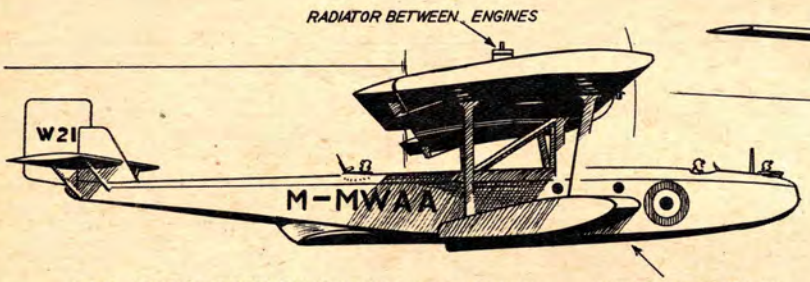
AIR PROGRESS

By DOUGLAS ROLFE

THE DORNIER STORY

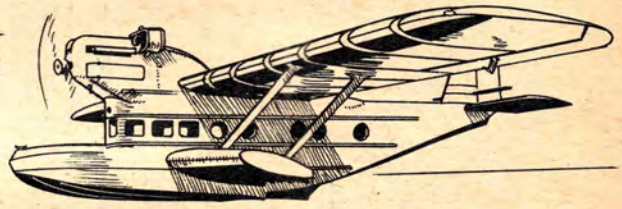


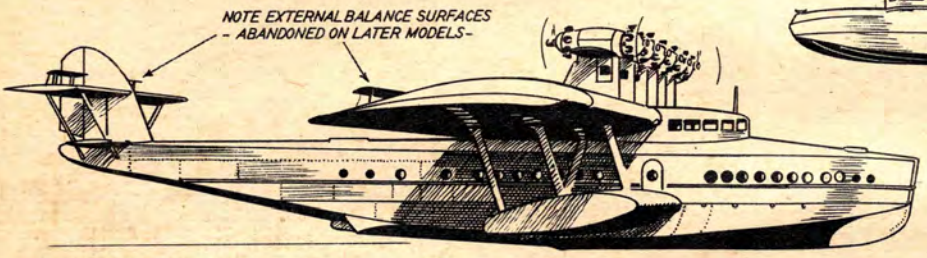
1922 DORNIER KOMET (185 H.P. B.M.W. ENGINE). THIS 6-PASSENGER TRANSPORT WAS ONE OF DR. DORNIER'S FIRST ALL-METAL COMMERCIAL DESIGNS AND FLEW WELL



1923 DORNIER PROTOTYPE WAL (TWO 300 H.P. HISPANO-SUIZA ENGINES MOUNTED IN TANDEM ABOVE THE WING). THE SAME GENERAL DESIGN IS RECOGNIZABLE IN ALL SUBSEQUENT DORNIER BOATS

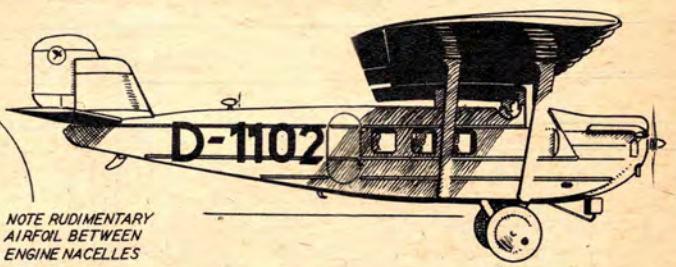
DORNIER BOATS DID NOT HAVE WING TIP FLOATS — USED SPONSONS INSTEAD

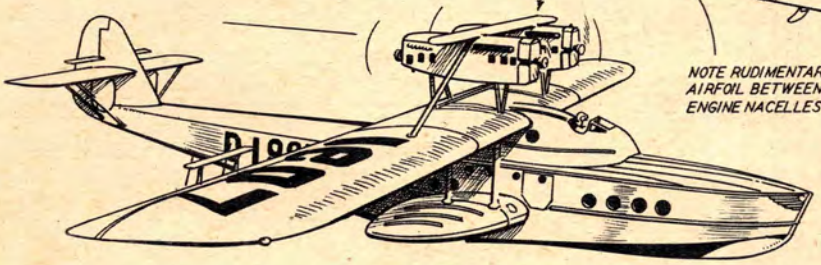




1928 DORNIER DELPHIN (600 H.P. B.M.W. ENGINE) .. 9-PASSENGER CIVIL TRANSPORT

1929 DORNIER Do.X (TWELVE 550 H.P. SIEMENS—LATER, TWELVE 615 H.P. CURTISS ENGINES) ALTHOUGH DESIGNED TO SEAT 72 PASSENGERS IT ONCE CARRIED 150 PASSENGERS. A CREW OF 10 AND 9 STOWAWAYS! IT WAS FIRST PLANE IN THE WORLD WITH A FLIGHT DECK AND A CREW WHICH INCLUDED A FLIGHT ENGINEER



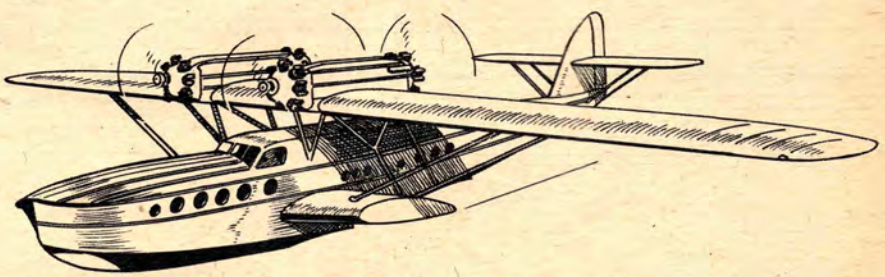


NOTE RUDIMENTARY AIRFOIL BETWEEN ENGINE NACELLES

1930 DORNIER MERKUR (600 H.P. B.M.W. ENGINE) 6-8 PASSENGER CIVIL AIRLINER. MAXIMUM SPEED WAS 120 M.P.H.

1930 DORNIER Do. SUPER-WAL (FOUR 600 H.P. HISPANO-SUIZA ENGINES) THIS 22 PASSENGER BOAT WAS THE SMALLER SISTER OF THE Do.X. (TOP SPEED 127 M.P.H.)

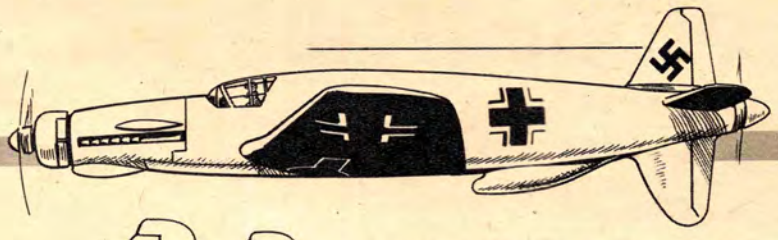
1932 DORNIER Do.S BLAUWAL ▶▶ (FOUR 550 H.P. BRISTOL JUPITER ENGINES) A CONSIDERABLY CLEANER VERSION OF THE PRECEDING WALS WITH ENGINE NACELLES BEDDED DOWN INTO THE WING AND UPPER RUDIMENTARY WING ELIMINATED

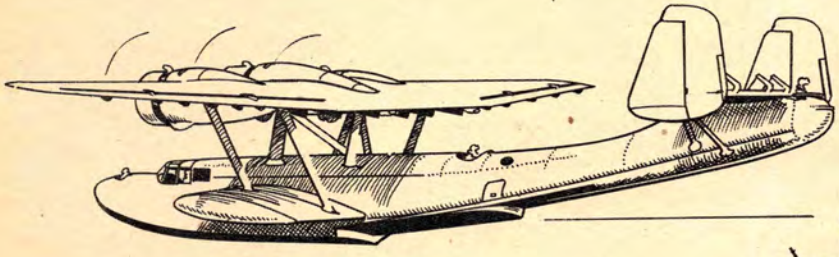


Dr. Claude Dornier of Germany was one of the earliest exponents of all-metal construction for aircraft—a result of his one-time association with the Zeppeliner Werke in Friedrichshafen, which supported his efforts, and consequent exposure to Count Zeppelin's well-known views on the subject of metal construction. In any event Dornier runs Junkers a close second in developing this form of construction for airplanes, and is second to none in regard to the pioneering of really big airplanes.

In 1922, the firm which was known as Zeppelin Werk Lindau G.M.B.H., changed its name to Dornier Metallbauten, and at first turned out a series of shoulder-wing civil transports that were, for the period, excellent aircraft. Early models had a unique cantilever landing gear which offered minimum drag. The "Wal" series of boats followed, and with various modifications and improvements

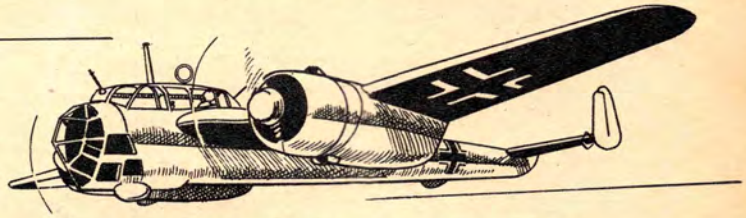
One of the first German aircraft firms, pioneers of large planes, all-metal structures

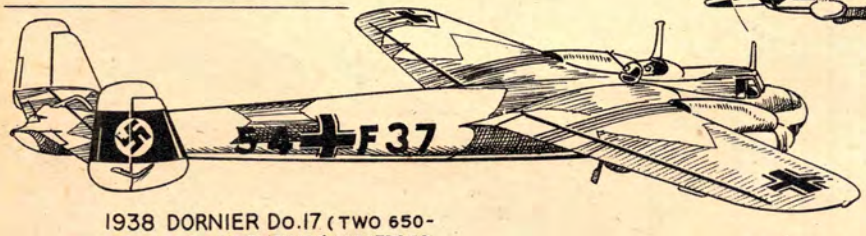




1945 DORNIER Do.335 (TANDEM ENGINES, TANDEM PROPS). ONE OF THE LAST DORNIER DEVELOPMENTS BEFORE THE CRASH OF THE THIRD REICH HALTED DORNIER PRODUCTION. VERY FAST (477 M.P.H.), IT WAS A FIGHTER AND RADICALLY DIFFERENT FROM DESIGN ANGLE

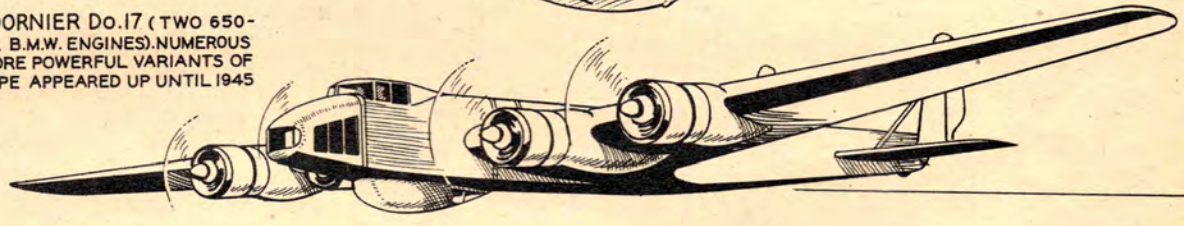
1942 DORNIER Do.24 (THREE 880 H.P. B.M.W. ENGINES) THIS AND THE FOUR-ENGINE Do.26 WERE FINAL DEVELOPMENTS OF THE Do.WAL





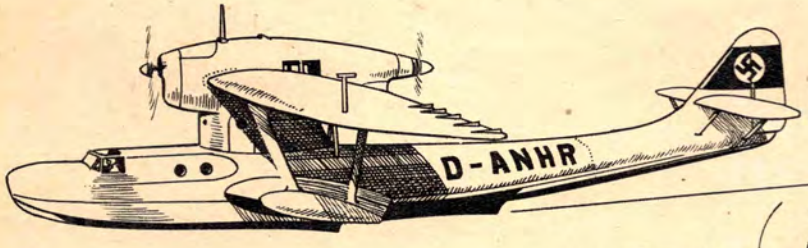
1939 DORNIER Do.17z (TWO 1,000 H.P. BRAMO 323 RADIAL AIR COOLED ENGINES) WAS PREDECESSOR OF THE FAMOUS 217 SERIES EXTENSIVELY USED BY LUFTWAFFE

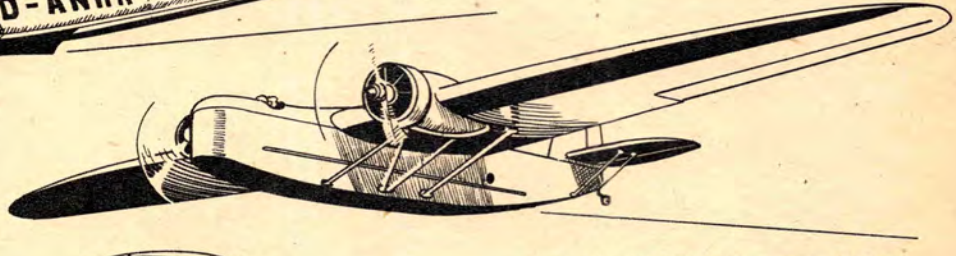
1938 DORNIER Do.17 (TWO 650-750 H.P. B.M.W. ENGINES). NUMEROUS AND MORE POWERFUL VARIANTS OF THE TYPE APPEARED UP UNTIL 1945



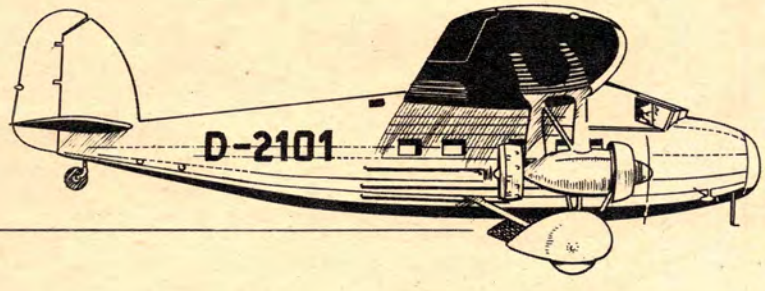
1938 DORNIER Do.19 (FOUR 650 H.P. BRAMO ENGINES). PRE-WAR HEAVY BOMBER OBSOLESCENT WHEN WAR BEGAN

DOUGLAS ROLFE





1938 DORNIER Do.18E TWO 510 H.P. JUNKERS JUMO ENGINES). CIVIL AND MILITARY BOAT. ESTABLISHED A NEW LONG-DISTANCE RECORD (5,220 MILES)



1934 DORNIER Do.F (TWO 550 H.P. SIEMENS ENGINES). THIS AIR FREIGHTER CARRIED A USEFUL LOAD OF 4,400 POUNDS AT 137 M.P.H., HAD A PARABOLIC WING SIMILAR TO THAT OF THE Do.K AND WAS FIRST DORNIER WITH A RETRACTING LANDING GEAR

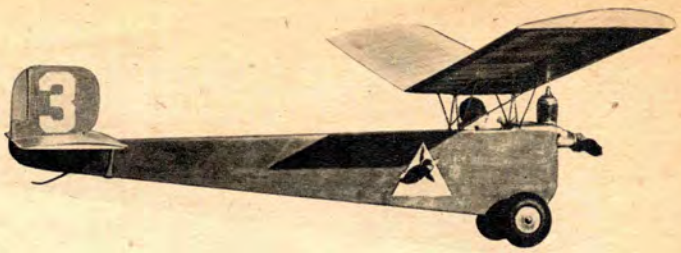
◀ 1932 DORNIER Do.K (FOUR 240 H.P. WALTER ENGINES). 10-PASSENGER TRANSPORT WITH PARABOLIC (SCIMITAR) WING. CRUISING SPEED WAS AROUND 124 M.P.H.

remained one of the best Dornier types until the collapse of Germany in World War II.

The early "Wal" flying boats hung up many outstanding records and made North and South Atlantic crossings. The enormous Do. X, itself a greatly enlarged version of the standard Super-Wal, was probably the first practical giant plane to be built. A number of these huge craft were produced and at least one completed two Atlantic crossings.

During the Hitler war Dornier made notable contributions to the Nazi cause with highly efficient day and night bombers, attack and dive bombers. Several versions of the curious Do. 335 were built, including night fighters, fighter-bombers and a two-cockpit trainer. All resembled the model shown—which came out too late to take part in the conflict.

Blunderbus



By S. CALHOUN SMITH

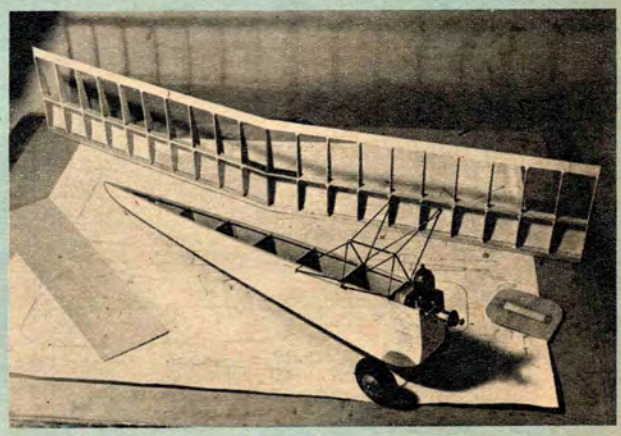
■ This little straight line special will never win any contests, but for Sunday afternoon fun it can't be beat. If ever a design has been flight proven, this one has. It is a veteran of nearly a year of weekend flying sessions. Damage to date: punctured wing covering from roosting in trees.

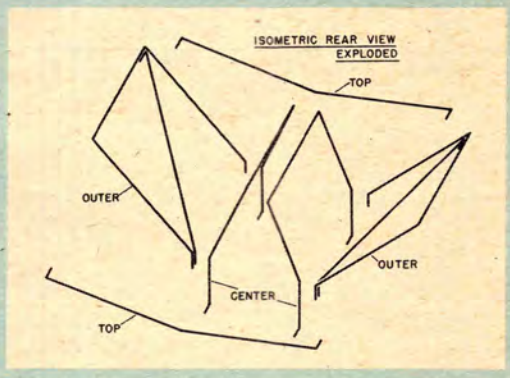
Blunderbus was inspired by a Doug Rolfe sketch of an ultra-light German ship built by Albatros in 1924. This "Sportflugzeug" was a tiny single-placer powered with 30-40 hp Bristol Cherub engine, and from its appearance in the sketch was simplicity itself designwise.

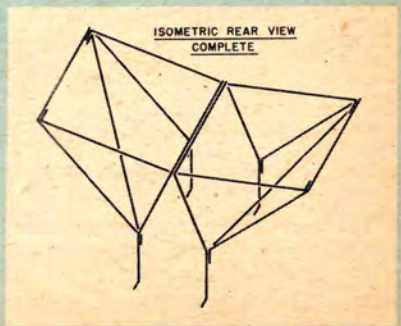
Because no complete plans were available of the real aircraft, the model was designed with typical free-flight proportions merely to resemble the big ship. The comma-shaped rudder was added just for appearance.

Model specifications are: span 30½", length 21", wing area 150 sq. in., stab area is one-third of wing area; power with any .049 engine. Weight is 8 oz., pretty heavy for a small free flight, but since contest performance was not wanted, much durability of structure was gained by building fairly heavy.

Fuselage construction is simple box-type. Cut out the fuselage sides of 1/16" sheet. Mark former positions on inside surfaces. Since fuselage is rectangular no former drawings are given on the plan. Formers can be made by referring to the plan top and side views. Cement 1/16"







Blunderbus is no contest hot-shot, but will take a terrific beating and turn in consistent sport flights. Easily ROG's from smooth surfaces. That's young "Skeeter" Smith, 8, launching the scale-like 'Bus.

x ⅛" longerons along the top and bottom edges of the fuselage sides. Notch former corners to fit over the longerons. The firewall is a piece of ⅛" plywood backed with pine strips opposite engine mounting holes. The pine furnishes some thickness for wood-screw mounting.

Cement ¼" sheet front, firewall and next two ⅛" sheet formers to one fuselage side. Add other side. Work upside-down over plan top view. Sides are parallel in this front section, so good alignment here is important. Add formers progressing toward the tail, checking against top view for straightness and squareness. A block of pine or plywood is next added across bottom for landing gear attachment. Block in nose and let whole fuselage structure dry thoroughly.

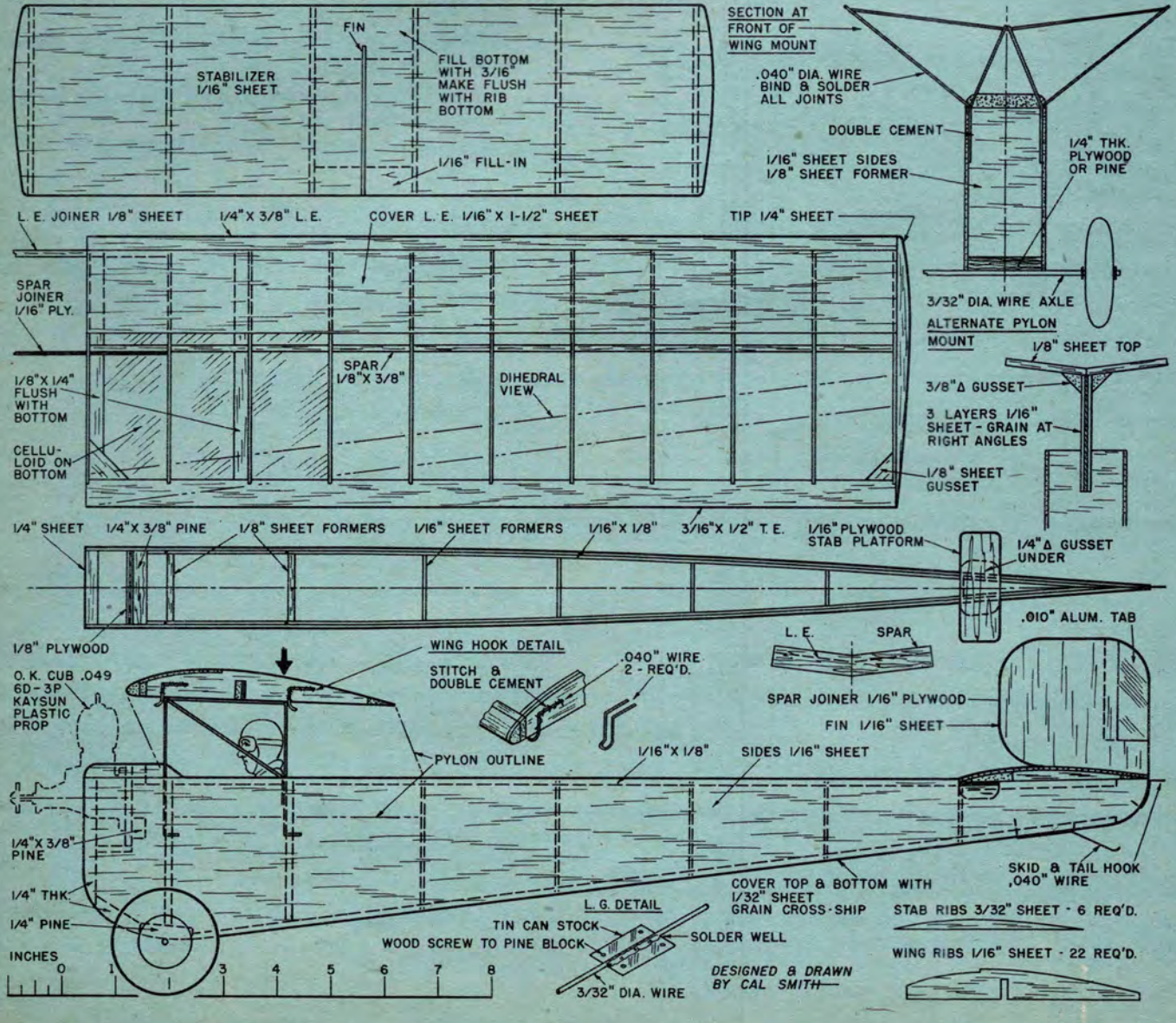
The scale-like wire wing mounting is the only fussy part of the model, and unless you are handy with pliers and soldering iron, the alternate pylon mount should be built. The wire wing mount enhances the appearance of the ship and has proved rugged and practical for flying. The isometric sketches show the makeup of the wire pieces. Center pieces are bent to shape first; note difference in height in side view for wing incidence. The center pieces are joined at the top corners by binding with thin soft wire and soldering. The bottom ends pass through notches in formers at side former corners.

Next bend outer wire pieces and diagonal braces and join these to center pieces. This operation is best done upside-down over a board with center piece blocked up ⅜". And the work must be done with parts carefully aligned. The top pieces pass under the center piece top corners and touch the inside edge of outer piece corners. Bind all joints and solder well. This complete wire mount is then pushed into place at the front of the ⅛" formers. Double-cement where wire passes down corner.

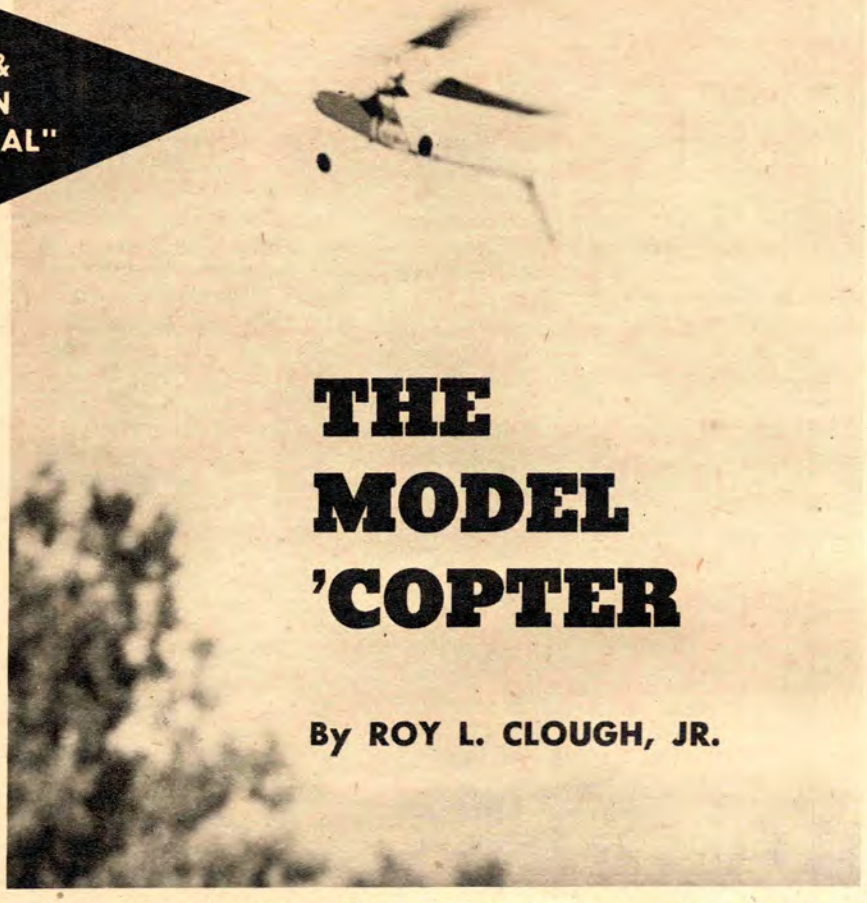
If you prefer the pylon mount make the pylon of three layers of 1/16" sheet joined with criss-cross grain, like plywood. Cut to outline shown in phantom lines on plan side view. Notch formers to receive the pylon base. Pylon top is made of ⅛" sheet and can be rectangular or oval in outline. Run grain spanwise and gusset corners where top pieces join vertical member. With wing mount in place, cover top and bottom of fuselage with 1/32" sheet, grain running cross-ships. Add plywood strip for stab mounting and gusset bottom surface. Add tail hold-down wire hook and tail skid. Double-cement over the wire.

Landing gear is about as simple as you'll find, consisting of a straight length of wire soldered across a piece of tin can stock. Use four wood screws to fasten the tin plate to the fuselage bottom at the pin block.

Wing construction follows standard procedures. Cut out the required number of ribs (*Continued on page* 50)



DATA & DESIGN "SPECIAL"



THE MODEL 'COPTER

By ROY L. CLOUGH, JR.

Roy's little Infant job (AT Sept. '52) in flight. Damper fins have been removed and rudder turned over. Model will fly steadily forward, descends via auto-rotation pitch changes.

Roy's continued research into the whirlybirds has produced some fine models including the first truly successful stable co-axial type. This is fascinating stuff, folks.

■ In our previous series of articles, ("What's the Score on Helicopters?") the writer tried to present a simple basic understanding of the major forces involved in a rotary wing flying machine.

We saw that the problem of flight stability largely resolves into integrating the natural gyroscopic forces of a rotating system with its aerodynamic characteristics in such fashion that a reaction by either tends to maintain the positional integrity of the system with respect to the rotor mast.

This, in the practical application, requires a certain amount of independence between mast and rotor in order to prevent immediate displacements from setting up a chain reaction of self-aggravated wobbling, and a certain amount of interdependence in order that control may be effected, or imposed upon the rotor, and that the mast shall serve as a reference point, ruling the plane of rotation of the rotor.

Thus it becomes quite simple to design a vertical-lofting or hovering model, by simply arranging the rotor to feather along its longitudinal, or spanwise axis and by hanging the hub in a gimbal which permits a see-sawing action, and positioning the blades by means of a flyweight or paddle bar so they will not roll over or develop flutter in a chord-wise plane. A rotor such as this is said to be *independent,* for if all bearings are free it will rotate in its own optimum plane regardless of the position of the fuselage, or mast.

This is fine for an indoor model where gusts are not a factor, and when it is not desired to obtain forward flight. However, the *completely* independent rotor is not desirable, even for model work, because it has no reference point from which control can be effected. (In the practical sense it is well to point out that a completely independent rotor does not exist; there is always some friction in the pivots and gimbals which tends to position the blades at 90 degrees to the mast, but this residual friction is seldom much in a model). Therefore, we must build in a small amount of friction, either by making the gimbal fittings a bit stiff to begin with, or by providing a drag of some sort which can be adjusted. When this is done the model will fly forward by simply changing the C.G. slightly, since the reaction of the rotor, in seeking to justify its position with respect to the angle of the mast and aerodynamic pressures, will result in cycling pitch.

This is the simple way of doing it and it works quite well for models. By judicious use of a small weight arranged to slide fore and aft, the model will climb vertically or fly forward at a fast clip in satisfactory fashion. By reference to the previous articles, note that sidewise flight can be obtained by raising or lowering the torque prop axis, or alternatively the weight can be attached to a wheel strut. Keep this trick in mind; later, when building gas models, you may wish to position the gas tank in such fashion that the attitude of the model changes in flight; as for example, take-off directly into forward flight with the speed decreasing as fuel is consumed and with let-down in autorotation vertical.

Cyclic control of the rotor is a bit more complicated, but not greatly so, and undoubtedly it will eventually replace C.G. shift control except in the simplest models. This is particularly true when we consider the advantages of such a system in contest flying.

A cyclic control system means having a control which can be moved to secure flight in any desired direction, without changing ballast, by altering the pitch of the rotor blades for a segment of their sweep around the circumference of the "disc."

The type of cyclic control we are interested in for model work is the so-called "indirect" or reactive control, in which the linkage is not directly attached to the rotor, but to an intermediary point from which the rotor is controlled. If we tried to attach the cyclic mechanism directly to the blade roots, and connected the other end of it to the fuselage, we would find that this

would freeze the system, resulting in a stiff rotor and destroying the stability we gained by freeing the rotor from the mast in the first place.

Therefore we must control the rotor from some point not rigidly attached to the fuselage. With the Bell system, this is the Young fly-bar control (see sketch). To work this connect the fly-bar to the longitudinal pivot with a jointed lever which can be cyclicly pulled inward at the joint, thus changing the angle between the fly-bar and the blades, for a segment of each revolution. The reaction of the blades to this deflection gives cyclic control.

The Hiller Paddle system (see "Rotor-matic" sketch) uses two short wings set upon a cross-arm which is attached to the central pivot. The angle of these wings or paddles may be changed through a simple scissors type linkage which is attached to a swash plate. When the swash plate is tilted the angles of the paddles change in rhythmic cyclic fashion with each revolution, and the rotor blades' reaction to this produces a longitudinal rolling of the rotor which results as cyclic pitch. This system is very simple, as is the Bell, but in both cases avoid any considerable play in the linkages since this may result in excessive wobbling and erratic control. However, for most small models this may not be critical because of the strong damping effect (scale effect) present in models.

As a footnote to these two systems we can add that it isn't strictly necessary to duplicate the control systems of the originals in order to get satisfactory performance. Here is a simple dodge, which judiciously applied works most effectively. Build the rotor, with its paddle beam or fly-bar in the simplest fashion and simply stick a wire up from the fuselage in such a way that the cross-arm bumps it gently at the same point every revolution. Presto! The reaction gives you cyclic control.

Remember, however, that this is control by unstabling—the bumper wire should be quite flexible or the fuselage may sway excessively, and, while it sounds very simple, and it is, it can get out of hand by displacing the rotor too far if the jolts are too heavy.

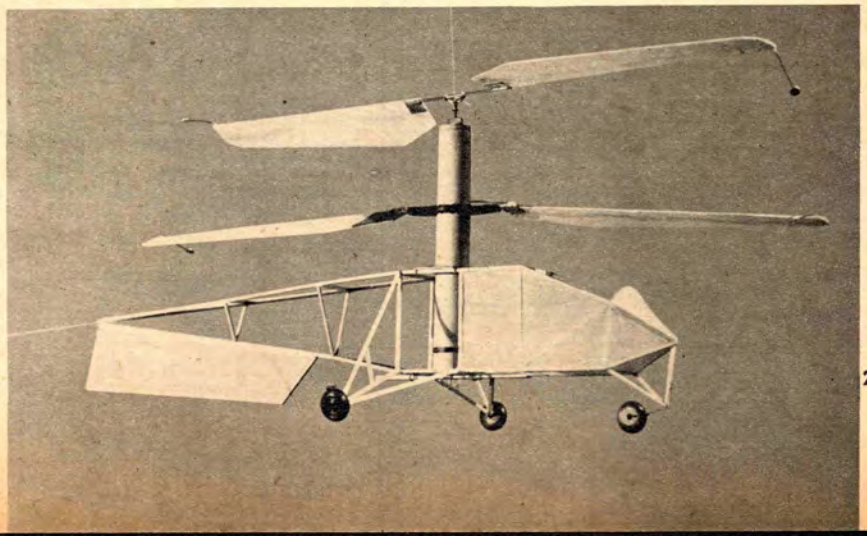
In an effort to develop a system which would lend particular emphasis to the qualities desirable in model helicopter work, we have designed a two-part series of rotors which we term the "bungee-dynamic series."

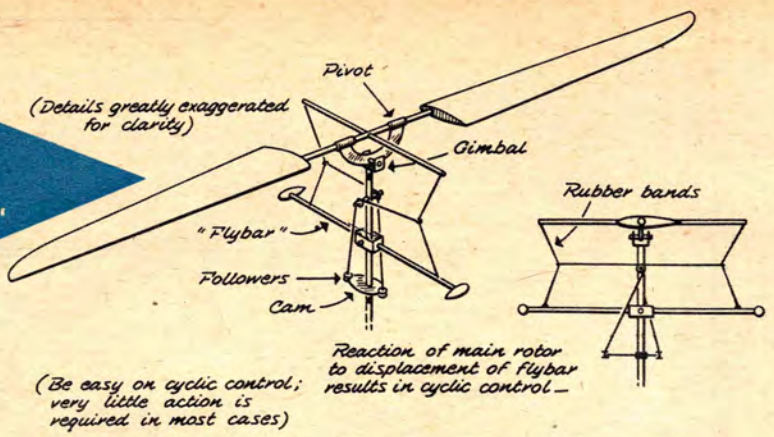
Tandem rubber job. Rotors are Young fly-bar type; power transmitted through bevel gears at each end of long motor which equalizes thrust. Brake on one rotor permits forward flight.

These rotors cover a wide field of application and include power delivered at the hub and power applied at the tip, which means the series covers rubber, internal combustion, rocket, pressure jet and ducted fan configurations. In the middle of the series is our special pride and joy—a system which we believe to be the first truly successful, inherently stable, co-axial rotor arrangement, which positively controls the ancient problem of rotor clash.

The basic rotor and its derivations are shown in the drawings accompanying this article. We start with a two-bladed rotor (see sketch "Basic Rotor Design—Cyclic Control") which is see-saw mounted in gimbals and free to pivot, within limits in a spanwise fashion. This rotor is of the first part of the series, which we term "locked."

Co-ax close up. Dimensions not critical, but if large version is built top rotor should be hung in gimbal since tension of heavy rubber motor may not allow sufficient see-saw.




Pivot
(Details greatly exaggerated for clarity)
Gimbal
Rubber bands
"Flybar"
Followers
Cam
Reaction of main rotor to displacement of flybar results in cyclic control—
(Be easy on cyclic control; very little action is required in most cases)

Model Interpretation of
YOUNG "FLYBAR" CONTROL

By this is meant that the pitch of the rotor blades relative to each other is fixed at all times (as in the Hiller) except as subject to collective pitch control. The blades are stabilized by means of dynamic weights which protrude tangentially, about one chord length ahead of the blades' leading edge. There is no fly-bar or paddle-beam; instead, we have a double horn to which are affixed two snubbers, or "bungees" which run to a swash plate which may be tilted to secure cyclic control. These elastic connectors replace the inertial damping forces of the fly-bar, or the aerodynamic damping of the paddle beam, and are simpler to work with than either of these.

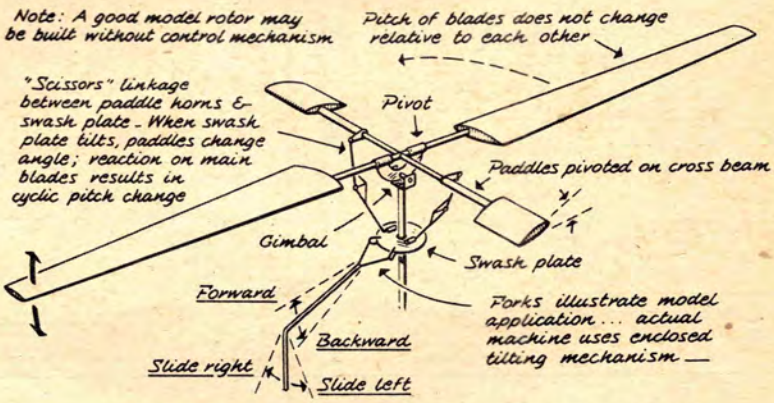
Because of the concentration of mass in the rotor tips we can use much lighter blades successfully—meaning balsa instead of birch or pine, and the corrective force is balanced at all times, exerting a positive, yet gentle steering action upon the system. This is the cyclic control version.

And if we desire extreme simplicity we just move the bungee connections 90 degrees, that is, affix them to the spanwise pivot to exert a continuous corrective force upon the see-saw axis, and the machine becomes controllable through C.G. shift.

From this point of departure we proceed to multi-blade applications—we may build a four bladed rotor simply by doubling up what has just been described, except that of course only one mast attachment, or swash plate will be required.

In order to build a stable coaxial machine, using rubber power as an example, we merely construct the lower rotor attachment with spanwise pivots and attach it rigidly, that is, without see-saw gimbal to the drive tube with a bent wire "lead-around" interconnecting the blades. The upper rotor must be free to see-saw about ten degrees up and down, which allows plenty of leeway against clashing with moderate gap, and this may be accomplished, in a rubber model, by simply rounding the edges of the thrust button—the tension of the rubber motor being sufficient "bungee" action.

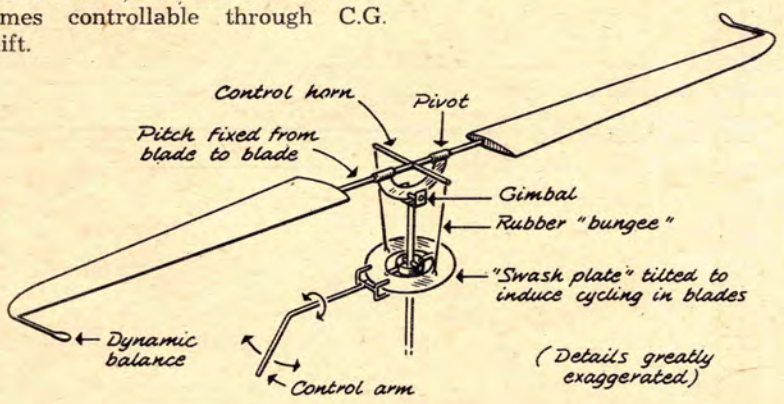
If we build a gas model, with shafting, then of course the upper rotor must be mounted in a gimbal and snubbed with rubber bands, permitting damped motion between stops. Now with such an arrangement as this we secure forward flight by trimming slightly nose-heavy. No other cyclic control is required. For heading control a simple fin, as shown, corrects for the downwash which may tend to rotate the fuselage the same way as the lower rotor. The sketch ("Basic Coaxial 'Bungee' Dynamic"), incidentally, is all the plan needed by any reasonably able builder to turn out his own machine in short order.


Note: A good model rotor may be built without control mechanism
Pitch of blades does not change relative to each other
"Scissors" linkage between paddle horns & swash plate. When swash plate tilts, paddles change angle; reaction on main blades results in cyclic pitch change
Pivot
Paddles pivoted on cross beam
Gimbal
Swash plate
Forward
Forks illustrate model application... actual machine uses enclosed tilting mechanism—
Backward
Slide right
Slide left

HILLER "ROTOR-MATIC" CYCLIC CONTROL

One note on adjustment: The downwash's tendency to rotate the fuselage is corrected by bending the fin. However, after doing so the machine may show a tendency to drift sidewise. This is due to the reaction of the air against the fin, so just move the rotor mast a trifle off-center to correct it, countering the side thrust with a bit of off-center lift.

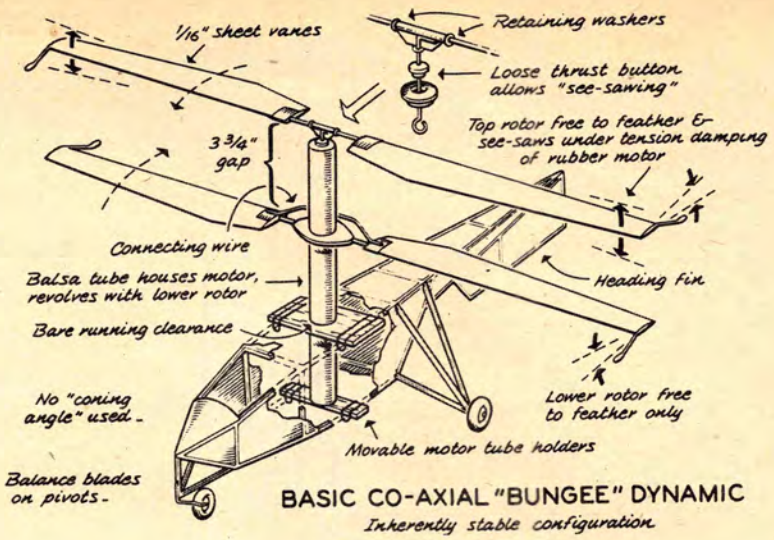
The second part of the series includes the unlocked rotors. These rotors may be built in any number of blades, from one, with counterweight, through two, three, four, five, or as many as desired. In the unlocked blade series (final sketch) we run into "dynamic pitch." By this is meant that the blades have no particular fixed pitch relative to each other or the mast, but seek pitch angles individually according to the speed of rotation. This is ac-



BASIC ROTOR DESIGN – CYCLIC CONTROL
Bungee-Dynamic Series

complished by positioning the dynamic balances well below and ahead of the leading edge of the blades, which causes them to ride up under the action of centrifugal force until a balance is reached between the force exerted by the upthrust of the counterweights and the aerodynamic pressure on the blades.

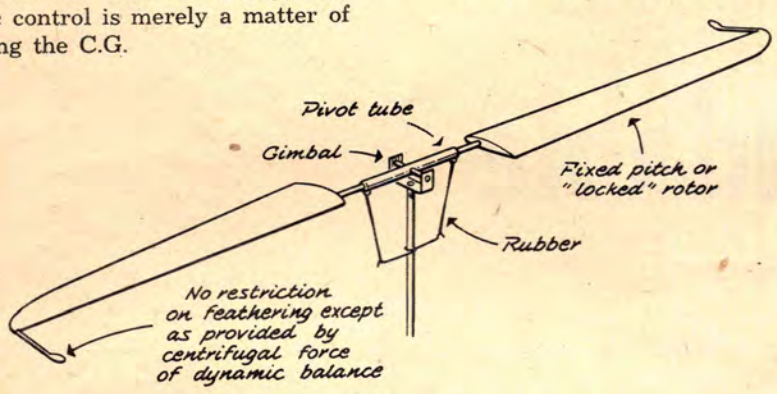
It is important with this system to locate the hinge line knowingly to obtain high efficiency, but in the practical application we find it works well even with rough approximation of position. The hub attachment of this system to the mast may be quite varied, from a simple rubber disc which functions as a universal joint, to separate snubbers for each blade pivot. This system gives us a built-in and fully automatic cyclic and collective control. Auto-rotational let-down is fully automatic (with a simple ride-out dog release on the mast) which solves a mechanical problem that can be knotty, and cyclic control is merely a matter of shifting the C.G.


1/16" sheet vanes
Retaining washers
Loose thrust button allows "see-sawing"
Top rotor free to feather & see-saws under tension damping of rubber motor
3 3/4" gap
Connecting wire
Balsa tube houses motor, revolves with lower rotor
Heading fin
Bare running clearance
No "coning angle" used.
Lower rotor free to feather only
Movable motor tube holders
Balance blades on pivots.

BASIC CO-AXIAL "BUNGEE" DYNAMIC

Inherently stable configuration

This machine believed to be first truly successful *stable* co-axial type to solve problem of control by C. G. shift and eliminate problem of blade clash. Could be flown with bungee cyclic control to lower rotor only. Model has been kept simple, no collective pitch used, hence let-down must be under residual power. *Dimensions*—Disc: 24". Mean chord: 1½". Tube: 7½" x 1" dia. (1/32" sheet). Fuselage: 3/32" sq. stock 18" long. Weight: 2 oz. *Performance*—Altitude: 20 ft. Forward flight: 25-30 ft. at 5-6 ft. altitude. (Hand-wound). That's high performance on three loops of 3/16" flat!


Pivot tube
Gimbal
Fixed pitch or "locked" rotor
Rubber
No restriction on feathering except as provided by centrifugal force of dynamic balance

C. G. RIG CONTROL

Bungee-Dynamic Series

There is just one precaution to be observed with this system in securing forward flight by C.G. shift. It is better to have the snubbers a bit too limp than a bit too tight, and don't overdo the nose-heaviness. The reason for this is that a condition of "over-cycling" will occur if the snubbers are too tight, that is, the blade pitch will adjust itself too rapidly, accelerating the cyclic action, meaning the model will nose down and dive into the ground.

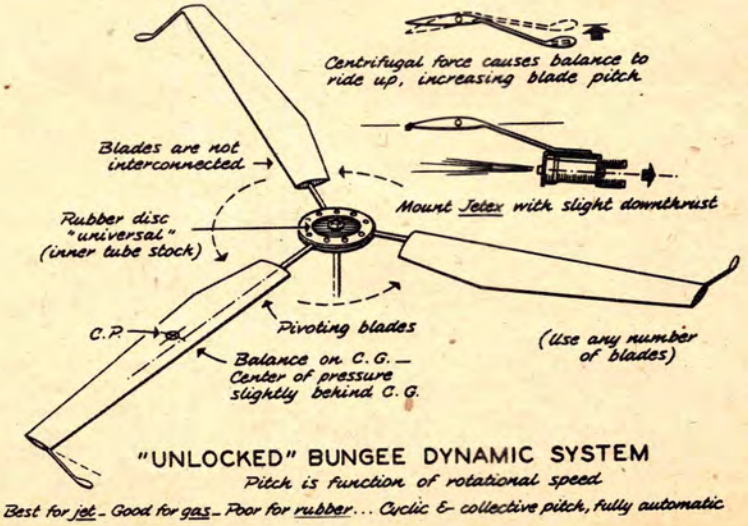
If the snubbers are too limp the worst that will happen is that the rotor will tilt backward and forward flight will proceed at a snail's pace. This adjustment is by no means highly critical—the admonition just given is of the same order as instructing a builder of conventional planes not to tilt up the leading edge of the stabilizer too far if he doesn't want the model to dive in.

Whatever system you elect to use, try to make your selection knowingly, based on what you want to do with it, compared with its characteristics. For example, the unlocked bungee-dynamic rotor is perfect for jet power, quite good for gas engine, and a complete bust for rubber—because it wastes too many revolutions in getting started. Rubber is a special case anyway, since the number of turns is always strictly limited by dimension, which isn't at all true in the case of jet or gas power.

For rubber models the best bet is to skip autorotation and bring the model down under residual power, or if you are the ambitious type, fly with a locked rotor which unlocks and de-pitches itself when the power is exhausted.

Once again, we strongly recommend that the first model should be rubber power—it will give you a wonderful opportunity to get the "feel" of rotor wing flying, without introducing a lot of distracting complications.

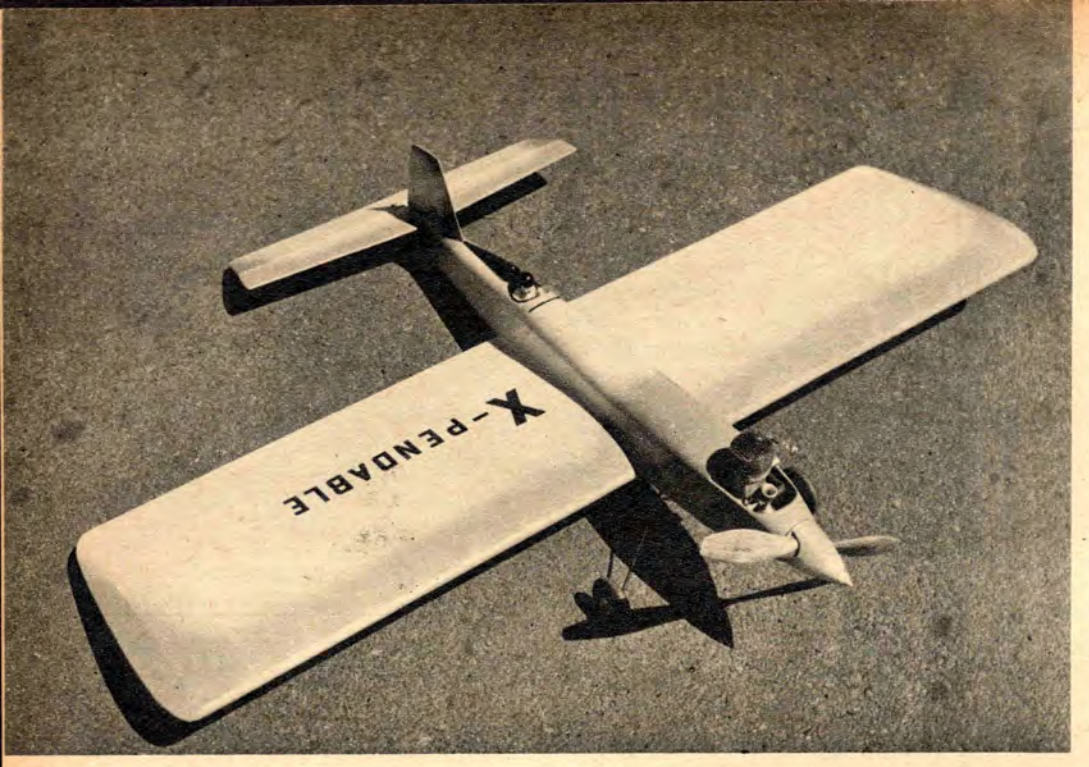
(To be continued)


Centrifugal force causes balance to ride up, increasing blade pitch
Blades are not interconnected
Mount Jetex with slight downthrust
Rubber disc "universal" (inner tube stock)
C.P.
Pivoting blades
(Use any number of blades)
Balance on C.G. — Center of pressure slightly behind C.G.

"UNLOCKED" BUNGEE DYNAMIC SYSTEM

Pitch is function of rotational speed

✓ *Best for jet - Good for gas - Poor for rubber... Cyclic & collective pitch, fully automatic*



X-Pendable

By JAMES G. SAFTIG

"This ship has been through the mill and I consider it one of my best efforts for a combat job . . . the pattern is easily done with it," says Jim, internationally known stunt champ

■ Mayhem in the air—combat flying—has taken over at the U-control circles. The spectators and flyers love it. A fast, maneuverable, strong, easy-to-build ship with some appearance is needed. Not wanting a solid fuselage, we came up with *X-Pendable*. The job is "Zilch" here and there, but it is a quickie to build. After the wood is chopped to size, a couple of evenings' work will find the model practically finished. This one gets off the ground in a hurry, hangs tight on the lines, and will turn on the proverbial dime. The longer moment arm (nose) added to the stability but didn't cut down on the sharp turns, which are definitely needed in the combat event. She's rugged, and a wad of glue here and there will stick most of her back together in short order in the event of a crash, unless, of course, there is a head-on splash. Then it might take two wads!

The ship can be built right out of the balsa rack. Standard sizes of wood were used for the main part and the few "odd-ball" sizes were salvaged from the scrap pile, which is usual equipment around any model builder's garage. Everything was kept as simple as possible from layout of the basic structure to the final paint job. Let's get on with the building.

Fuselage: Trim the two 1/8" sheet sides off as noted on the plan, making sure you check the nose detail drawing before doing so. Mark the sides (outer surface) with a light pencil line where the #2 and #3 formers will go. Cut the 3/8" tail block and taper it slightly so sides will open enough to take the formers when they are installed. Glue the tail block into position, using a couple of straight pins and a clothespin to hold it in place till the glue is dry.

While waiting, get your plywood gear mount and firewall marked, trimmed, and cut for installation of the motor mounts. Make sure the mounts fit snugly and are lined up straight. Also trim the sides as shown on engine bearer trim and drill template. When these fit the two formers, insert them between the fuselage sides and press the sides against them to see how they align and fit before gluing. Have the top sides up and see that they line up exactly with the top of the fuselage sides. This can be done by laying the top of the fuselage sides upside-down on a flat table, after the tail block has been shaved off flush on top and bottom.

When everything is checked out, take the engine bearers out of the notches in #2 and #3 formers and apply a liberal amount of glue on the edges of the notches and press the bearers back in place. Apply glue to all surfaces that will touch the sides of the fuselage *with the exception of the contoured portion of motor mounts extending forward of former #2!* Insert this assembly between the fuslage sides as before and press the sides together again, making sure everything lines up properly. Clamp the sides lightly together and allow to dry. While you're waiting, the stabilizer can be made and the elevator installed. The rudder may also be made at this point, using either plywood or balsa.

Wing: Using the W-2 template, trace out the rib pattern on a piece of 3/32" balsa and cut it out. This pattern can be used to cut the ribs individually but we used it to check the length cuts on the 3/32" sheet and squared off the ends. Set the pattern on top of all the pieces to be used for ribs, square them up, and drive two nails through the pattern and into as many of the rib sections as length will permit, then turn the pile over and drive more nails through the other side, making sure room is left to drill the wing spar hole and trim the notch for the leading edge.

Fire up the bandsaw and cut the whole stack of ribs to shape, notch them for lie, trim off for trailing edge insertion, and sand them to proper proportions. The center of the wing spar is then marked on the top rib section, and a 3/8" drill is run through the whole bundle. Results? All of the wing ribs complete and the spar hole drilled.

Before pulling out the nails, run a light pencil line across the top of the ribs so you will know which is the top, and also try to keep the ribs in the order in which they were stacked just in case there was a slight amount of error in your operation. Take out the nails and clean up each rib a bit before going on with the wing. Mark the 3/8" wing spar, leading and trailing edges over the wing plan for positioning, then slide the ribs

Meet San Diego's Jim Saftig, designer of "Zilch" line of stunt craft and winner of more than 50 first places in two years of competition flying. Saftig is 37 and a supervisor at Convair; he also acts as Commissioner of Model Activities for Consol. Vultee San Diego plant. Started modeling in '27 with Spirit of St. Louis.

into position on the spar. Check these for alignment, and glue. Notch the trailing edge, fit it, then glue into place. Next add the leading edge. Make sure all joints are thoroughly glued, then add the gussets as shown. When the wing is dry, trim 1/16" from the center four ribs. Add the soft balsa wingtips and taper the tip ribs as shown on the tip detail, using the *inner side* of the dark tip outline for a guide. These can be hollowed out a bit before gluing.

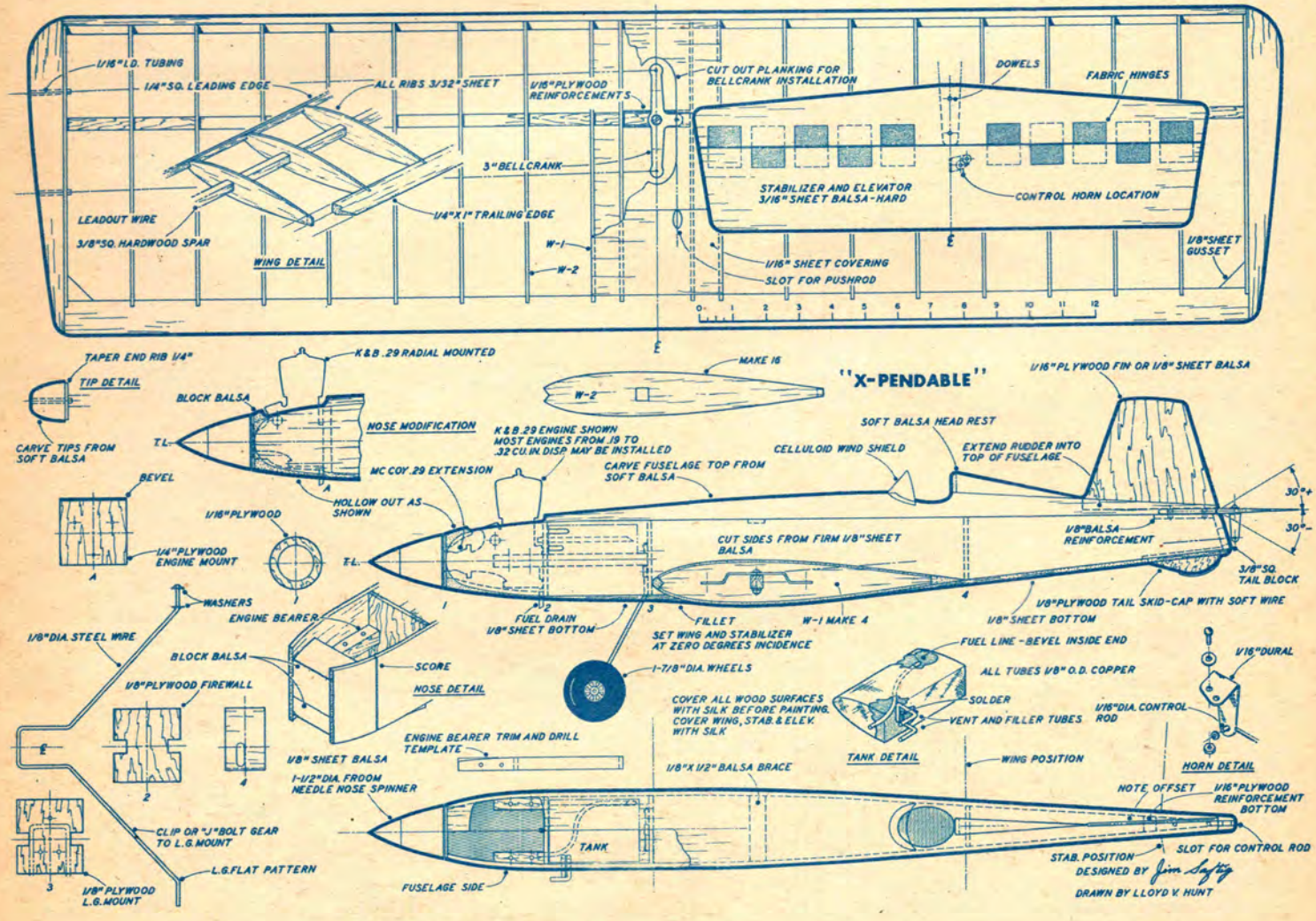
Drill the bellcrank hole and add the plywood reinforcements. Install the bellcrank after bending the aft ear slightly down so it will clear pushrod. Mark path of bellcrank wires on top of wing ribs with a light pencil line so a piece of 1/8" piano wire (which is used to push lead-out wire holes through ribs) will line up exactly with holes in bellcrank. Add wing tip tubing for lead-outs. Install lead-out wires and attach to bellcrank. Work crank in both directions several times after installation, check any wire drag on ribs, and clear them. Rout out area on two inboard ribs for clearance also. This should be fairly large.

Now add the 1/16" sheet to center section of wing on both top and bottom sides. After glue is dry, sand the wing completely smooth and fair in leading and trailing edges. Don't sand the trailing edge too thin, just enough to smooth it up. The wing is now ready for covering. Cover with silk or heavy Silkspan and dope it until you have a smooth, full finish which you can check by pressing your lips to the covered area and blowing, noting whether or not air is passing through the covering. Trim out top of wing as shown for pushrod clearance and bellcrank availability (needed only when installing wing). Your wing is now complete.

Score the fuselage as shown in nose detail, add glue to contoured part of motor bearers, and glue sides firmly to them. Add linen or silk over, scores after filling with glue. Solder two engine bolts through a piece of tin and slide through the underside of engine bearers. Repeat the operation on the opposite side. Set your engine in place to check out alignment. Remove engine and drill holes for landing gear mounting. Add gear, then nose blocks as shown. When nose blocks have dried, carve to fit and rout out hole for shaft and extension as shown, and give enough clearance so engine can be installed and taken out without binding.

Cover built section of fuselage with silk or Silkspan and dope thoroughly. Use original (*Continued on page* 48)

X-Pendable was sandwiched into a busy schedule for Saftig. He reported he was working at his Convair job "overtime, Saturdays, and some talk of Sunday—might get to be the richest man in the graveyard!" This combat model can be flown with .19 to .35 engines.



...the pendulum swings EAST!

22nd. 'NATS

WILLOW GROVE N.A.S., PENNSYLVANIA

Sponsored and Directed by:
THE NATIONAL EXCHANGE CLUB
with Cooperation of:
THE U.S. NAVY DEPARTMENT

NUMBER OF EVENTS GROWS AND GROWS...

FLASH! William M. White, Jr., of Sacramento, a 15-year-old Junior contestant, emerged as National Champion and the North California Free Flight Council's 6-man team copped top group honors in the "World Series" of model aviation to make it a clean sweep for the Californians. More than 1,200 competed; the weather was good except for the final day when it rained heavily. Numerous new records were set--more about them and lots of photos in coming issues. Here are top times in the indoor categories: glider--William Dunwoody, Brooklyn, 1:09.6; stick--Merrick S. "Pete" Andrews, NYC, 30:15.5; cabin--James B. Grant, Manchester, Conn., 25:26.6. Here are best performances regardless of age class in the outdoor events: limited rubber--Francis K. Heeb, Connersville, Ind., 13:34.4; Wakefield--Robert L. Hatschek, Bayside, N.Y., 14:04; limited towline--George Perryman, Decatur, Ga., 12:13; Nordic glider--James A. Pattison, Holloman AFB, N.M., 10:32.8; H.L. glider--Ed Krause, Milwaukee, 8:40.1; Half-A free flight--Ray Gable, Smyrna.

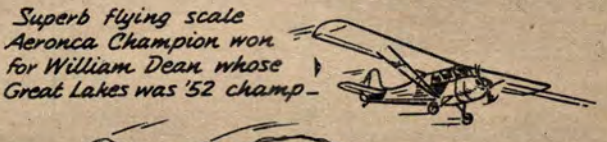
93 DIFFERENT CLASSES!

FOR FIRST TIME IN 20 YEARS EAST COASTERS ARE HOSTS TO AMERICA'S TOP FLYERS; PHILADELPHIA GROUP DOES OUTSTANDING JOB -

Sanctioned by:
ACADEMY OF MODEL AERONAUTICS

Ga., 14:14; free flight A--Dick Duvendich, Portsmouth, O., 22:08.2; free flight B--Marvin Burley, Jr., Spartanburg, S.C., 17:19.4; free flight C--Alvin Grenoble, Yuba City, Calif., 17:13; free flight ROW--Sal Taibi, Long Beach, Calif., 13:00.5; free flight Half-A scale--Edward Stoll, Detroit, Fairchild 22 with Wasp, 290.22 pts.; PAA-Load rubber--T. L. Gonzoph, Phila., 6:05.6; PAA-Load Half-A--Richard McGrath, Wyandotte, Mich., 12:59; PAA-Load A-B--Lew Mahieu, Long Beach, Calif., 13:56.1; PAA-Load Clipper Cargo Half-A--Hal Roth, Richmond, Calif.; radio control--Jack C. Port, Fairborn, O., 121 pts. (27 mc., original plane and receiver); Half-A speed--William Stewart, Trenton, N.J., 84.66 mph; Class A speed--Thomas Baker, W. Palm Beach, Fla., 130.43 mph; Class B speed--Walton Pyron, Decatur, Ga., 130.43 mph; Class C speed--Sam Dehelean, Detroit, 153.85 mph; jet--Sonny Mozel, San Antonio, 144.46 mph; precision aerobatics--Robert W. Elliott, Atlanta, 372.5 pts.; combat--Gerald F. Wagner, W. Cheshire, Conn., 560 pts.; control line flying scale--Thomas Dean, Corpus Christi, 170.7; team racing--Bob Huffer, Annapolis, 12:01.2; Navy carrier A-B-C--Dave Domizi, Rocky River, O., 391.5 pts.; Navy carrier Half-A--Gail Eckstein, San Lorenzo, Calif., 253 pts.; Hiller helicopters--Parnell Schoenky, Kirkwood, Mo., 121.41 pts.; Wakefield team flying--Detroit.

An estimated 7,000 models were at the contest; first Eastern seaboard Nats in 20 years brought out many old-timers such as Frank Tlush, Herb Greenberg, Bill Brown, John Young and Mahew Webster. Five AMA presidents attended--C. O. Wright placed high in PAA-Load events. It was a great meet and we'll have some great pictures for you next month.

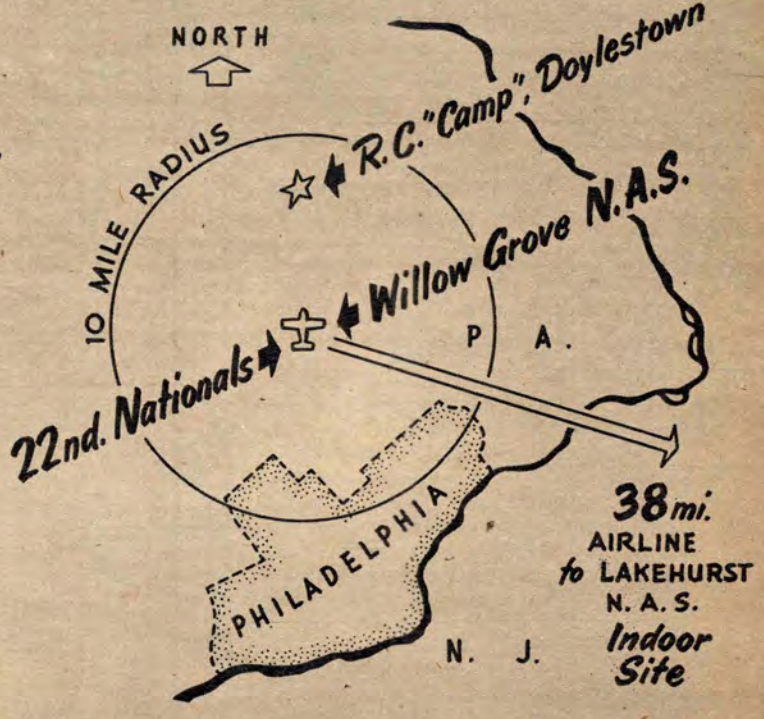


Superb flying scale Aeronca Champion won for William Dean whose Great Lakes was '52 champ -

"Combat" between H. De Bolt (Live Wire Sr.) and Walt Good (new "Wag") was top attraction in immensely popular radio control event -

New cl. D Sr. speed record of 153+ m.p.h. was set by Detroiter Sam Dehelean -

Hal Roth's long winged clipper cargo hefted 23½ oz. of payload with .049 McCoy diesel -

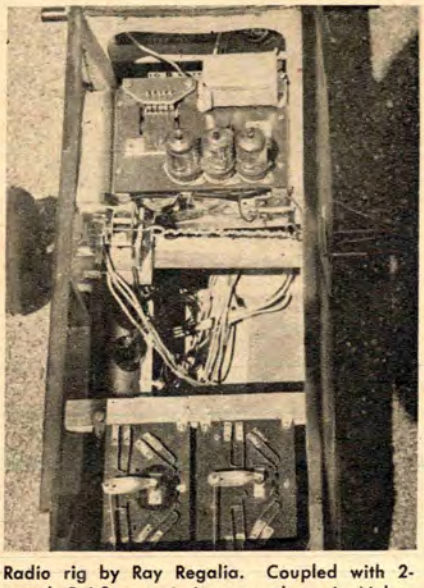


Western Roundup

AMAZING DROP-OFF IN INTERNATIONAL MEETS

■ Of utmost importance during the past month was the Semi-Final Eliminations for the West Coast members of the F.A.I. Wakefield teams. With all the trouble one goes to in setting up these contests, the money spent in sending the fellows to England, there is so little time, thought and effort made by so many guys that it leads one to wondering just what is the matter.

Are the guys staying out of the contest because their chances are slim? Are they staying out because we have eliminated a lot of the luck and they feel that their ships are not good enough? Do we need prizes for the runners-up? Just what incentive is needed? That is a moot question, but when one sends out hundreds of circulars, writes personally to all the Western officers of the Academy and gets only six answers, he does wonder if the fellows are interested. Some



Radio rig by Ray Regalia. Coupled with 2-speed Spitfire; covering on plane is Nylon. Up-down elevator, and right-left rudder; 5th channel takes engine control. A slick set-up.

pointed out that from Los Angeles to Yuba City was a long way; the same guys, though, would drive to Dallas for the Nats.

In spite of everything, however, we have two super flyers going to England, Joe Foster and Stan Hill. Joe is a tremendous competition flyer as those who were at last year's Nats will know. Active in all types of flying he even turned over 145 mph in U-control at the Nats. In indoor hand-launch glider he is the man to beat. Although Stan does not have the contest record behind him, he is a top flyer in gas and will certainly cause a lot of comment with his vertical take-offs. Stan is a doctor, probably the first time we have had one on our team, and a very good reason for his lack of contest winning could well be attributed to the years since the war he spent in

The former Janyce Wood, now Mrs. Eugene Stiles, with the Girl Scout troop that studied model building in Oakland under her guidance. Janyce has won events at Nats and Plymouth.

school to earn his degree.

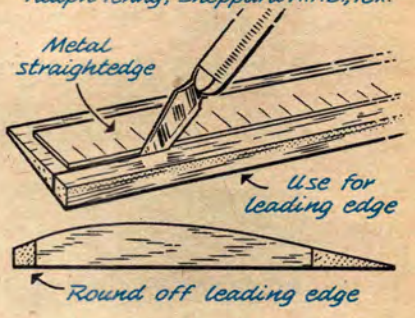
Pop Robbers and Lyman Armstrong had quite a contest. To quote Pop, "Truly sportsmanship at its greatest peak in these contests between our West Coast International modelers." Pop should have been a writer, for we can't help but admire the savvy he puts in his letters: "Experts with plenty of know-how—yes; temperamental stars—never. Grins and wisecracks, these boys take the breaks as they get them. As for the winners—their faces express realization that more than a trip to England has been won for now their task is to truly represent their country and uphold the great ability expected of West Coast modelers."

One guy held out at this contest, and he was the weatherman, for the contest opened with a chilly, disagreeable wind to fly against. Seems like the wind would and did change direction quicker than the guys could get into the air. Stan Hill had the problem licked—he set his model down on its tail, retractable fuselage strut and twin fin skids and let her go into a vertical altitude, no assisting here, no problem at all. Only one thing kept the contest going, the airport manager; we remember his name as Dick (can't forget this one and hope he'll forgive the rest), and he had a jeep and a Chrysler on which the guys would climb aboard, after launching their models, for a quick trip to the downwind side of the airport—from there on it was every man for himself.

Manny Andrades' F.A.I. job went window shopping in downtown Marysville. Hank Cole, who was top man for two flights, never did find his. Hal Roth, who was tops (*Continued on page 62*)

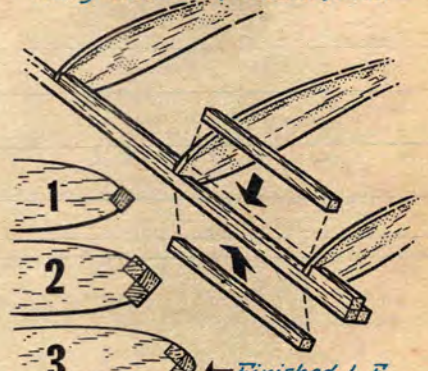
Here's one way to cut down on motor vibration in your R/C job. This by Hayden Gildersleeve uses sponge rubber between firewall and fuselage. Cub .14; Macnabb 27.255 mc. receiver.

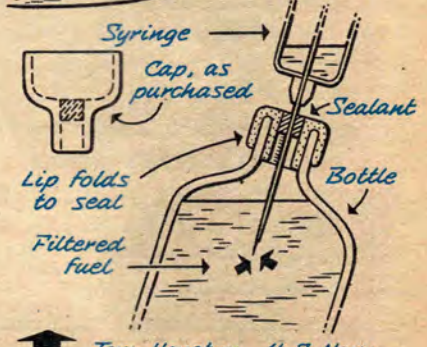
Large tapered T.E. stock yields both leading & trailing edges for A/2 and large rubber model wings reports Ralph Tenny, Sheppard A.F.B., Tex.



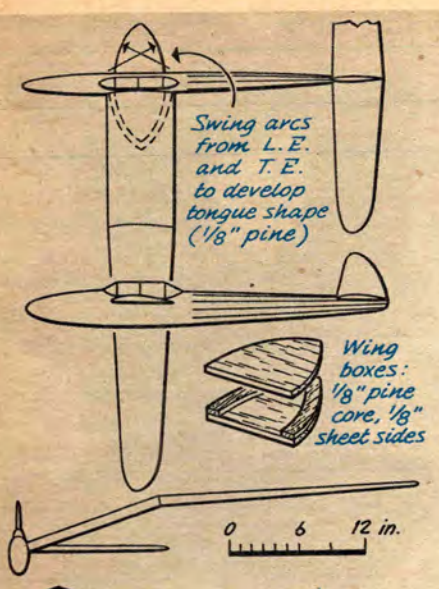
Have you developed something new in construction, control or flying? Send a rough sketch—we'll re-draw it and pay $5 for each accepted. Contributions should be original ideas; sorry, we cannot enter into correspondence on submissions.

This built-up leading edge is 25% lighter, very strong, easy to assemble, claims Harry Robertson, Phoenix, Ariz.

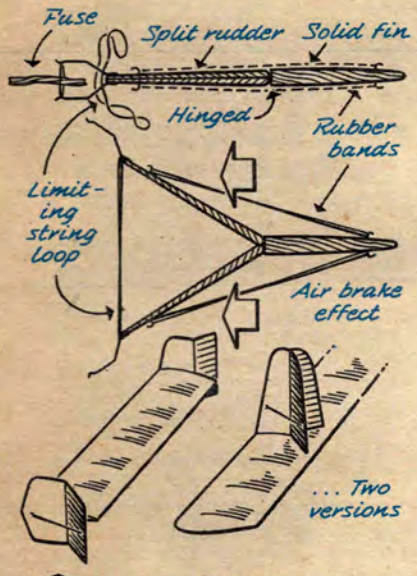




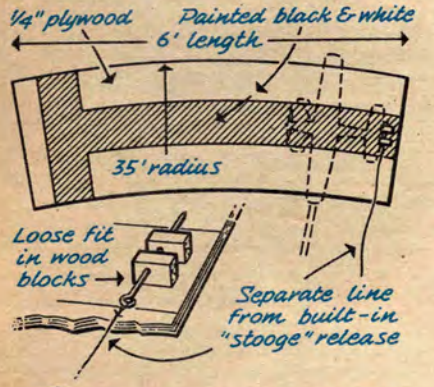
Tom Henebry, U.S. Navy, stores filtered fuel in bottles capped with "puncture-sealing" rubber tops; pierces these with hypo syringe for fueling, priming.



Six-foot-span semi-scale "Minimoa" by Hobart Hewett, Minneapolis, Minn., has neat plug-in tongue-and-box wing fittings; removable wing panels—



Preston McMichael, Houston, Texas, finds split-fin dethermalizer best for it permits stab tilting for turns without affecting dethermalizer action—



Small model group headed by Ronald Asplund, Saratoga, Calif., flying A/2 control models from rough ground developed this handy portable runway with integral "stooge" release —

Southern Scene

RASH OF BIG MEETS BOOSTS DIXIE FLYING

■ Hundred-degree heat, thunderstorms, hail, lightning and 40-mile gales, plus a hoax de luxe was the background setting for model aviation in District 5 during late June and early July. Heat that blistered the feet of the flyers, an old-fashioned Southern squall that interrupted flying on the final day of the Southeasterns, lightning that required rubber gloves for U-controllers, and two eager beer-filled beavers (not modelers) with a wild story in Atlanta newspapers.

Not being modelers and not having anything to do in their spare time, the latter concocted a plan to launch a kite to resemble a "ship from Mars," shaved a monkey to resemble, at first sight, a strange Man from Mars, arranging to have it fall in front of a passing car near Marietta, Ga.; and of course reporters went for it in a big way!

One story brought on others. A lady said she saw a strange slow-moving thing with small lights and a glow to the moving object. This gave us an idea. We suggested to the papers that this might have been a night free flight model with

For years and years we've been hearing folks say model contests should be reported regularly on sports pages of newspapers. It took the Air Force "Times" to turn the trick. Good for them.

landing lights and painted with fluorescent paint, so next day the story hit the front page! Anything for publicity for modelplanes!

The annual Miniature Air Carnival held at Birmingham, Ala., was worth 150 miles of travel. Fine lot of flyers, good weather, hard-working officials. Turned out to be a double show—one, the model meet; the other a parade of Exchange Club members and high brass.

Advertised as the "biggest one-day meet in the South," the All Dixie contest at Spartanburg, S. C., drew thousands of spectators all day long. One thing they forgot to announce in advance—when the "day" started and when it ended! We never dreamed they meant 12 noon to 12 midnight! Another first for the South: awards under candlelight. Real trouble was avoided when a Southeastern Federation member discovered the two sweet things at the master boards totaling the three times of speed flights and marking up "45 seconds . . . 42 seconds . . . 38 seconds, etc." But we still love 'em.

Bill Wallace and his R/C model sailplane. Uses FG-1 original 52 mc rcvr. Span 7'; aspect ratio, 12. Fuselage planked, solid leading edge, the weight 24 oz. Solid stab, rudder.

Spartanburg would have been "no meet" except for the interest and support of the American Business Club. Hats off to this organization.

It was great doing for Lamar Parker and Bill Taylor from Macon. They had fine times in speed and put all flyers on notice that the "worm has turned" for them. Gordon Bone, the jet man who was felled by a Hot Canary at the 1952 Southeasterns, returned to the wars and took first place in the jet event. Bone says, "The safest place to be when jets are flying is on the handle end of the operation."

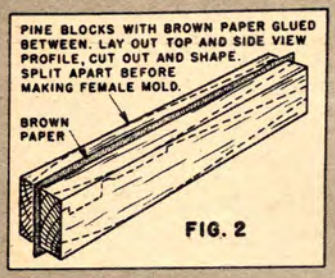
High honors, perpetuals, permanents, loving cups, U. S. Savings Bonds galore were handed out at the 15th Annual Greater Southeasterns. Even the usual die-hards were singing praises. Two hundred and eighty-eight flyers, 585 planes registered in from Puerto Rico, California, Texas, Indiana, Arkansas, Ohio, Kentucky, Tennessee, Alabama, Mississippi, Florida, Georgia, North and South Carolina, topping all previous records. Organization was better than any meet we've ever seen. And there were good reasons.

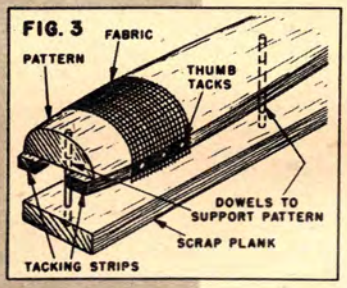
Since last January semi-monthly and weekly meetings were held for advance planning. For a change, I got to see the contest! To next in command, Robert S. Davis, president of Atlanta Congress of Model Airplane Clubs, goes much of the credit. Under his leadership a fine staff of assistant directors were all ready when Lt. William Yarbrough arrived from Naval Air Station, Pensacola, to be the CD. They (*Continued on page* 68)

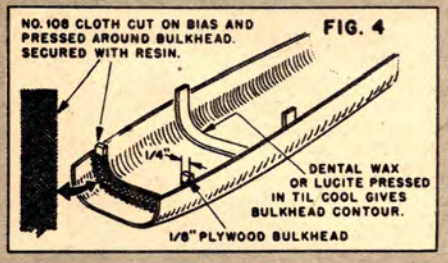
Another West Coast delta speed model, this one by Jack Hansfords. It is powered by a Mac .19 and spans 12 inches. Sweep is 60 degrees. Both lines lead through same guide.

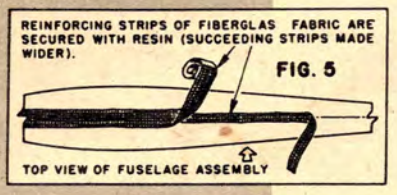
Classy gassies with glass chassis? Non-crashable craft with resin rudders and polyester pants? Don't gasp, class, the glass fibers are new friends of radio fans

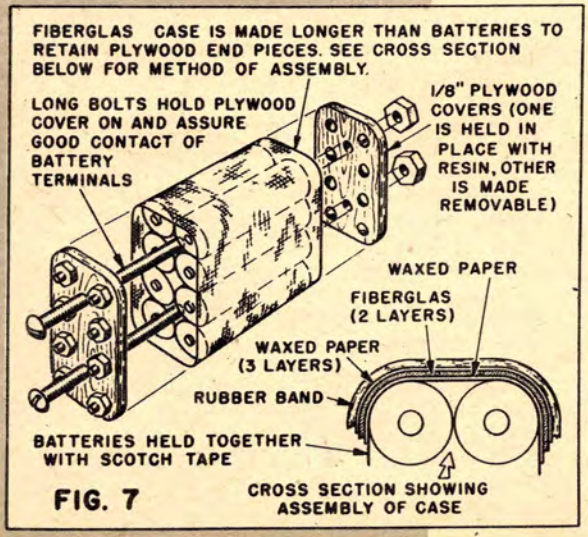
FIG. 1


PINE BLOCKS WITH BROWN PAPER GLUED BETWEEN. LAY OUT TOP AND SIDE VIEW PROFILE, CUT OUT AND SHAPE. SPLIT APART BEFORE MAKING FEMALE MOLD.
BROWN PAPER
FIG. 2




NO. 108 CLOTH CUT ON BIAS AND PRESSED AROUND BULKHEAD. SECURED WITH RESIN.
FIG. 4
1/4"
DENTAL WAX OR LUCITE PRESSED IN TIL COOL GIVES BULKHEAD CONTOUR.
1/8" PLYWOOD BULKHEAD


REINFORCING STRIPS OF FIBERGLAS FABRIC ARE SECURED WITH RESIN (SUCCEEDING STRIPS MADE WIDER).
FIG. 5
TOP VIEW OF FUSELAGE ASSEMBLY


FIBERGLAS CASE IS MADE LONGER THAN BATTERIES TO RETAIN PLYWOOD END PIECES. SEE CROSS SECTION BELOW FOR METHOD OF ASSEMBLY.
LONG BOLTS HOLD PLYWOOD COVER ON AND ASSURE GOOD CONTACT OF BATTERY TERMINALS
1/8" PLYWOOD COVERS (ONE IS HELD IN PLACE WITH RESIN, OTHER IS MADE REMOVABLE)
WAXED PAPER
FIBERGLAS (2 LAYERS)
WAXED PAPER (3 LAYERS)
RUBBER BAND
BATTERIES HELD TOGETHER WITH SCOTCH TAPE
FIG. 7
CROSS SECTION SHOWING ASSEMBLY OF CASE

By JACKSON INGHAM, JR.

HOW TO USE Fiberglas FOR R/C AND F/F MODELS

■ Here is an exciting new material for model building. With it compound curves are readily made, and the finished product will have exceptional strength and a beautiful glass-like surface.

Most of us are aware that Fiberglas is being laminated into custom automobile bodies and boats. For our experiments we have used many of the same techniques and materials, except for a much thinner and lighter weight cloth. Simply, Fiberglas consists of a glass fiber (usually in the form of cloth) impregnated with a polyester resin. The cloth is available in various weaves and thicknesses, the resin as a thick liquid which hardens by means of the ultra-violet rays of the sun or chemically, according to the type used. Both the sun-cure and chemical-cure resins require the addition of a catalyst just prior to actual use.

The general use of Fiberglas (F-g) in model work has been divided here into three parts. First, as used directly over balsa to strengthen or protect such areas as wingtips, firewalls and cabin sides wherever gauze and cement are indicated and to make repairs to weakened or broken construction. Second, as a finished laminated section such as fuselages, cowls and hatches. And third, as a laminated female mold to produce finished pieces.

The easiest use of F-g is directly over any carved or sheeted balsa area (Fig. 1). The lightweight cloth may be laid on dry and then brushed down with mixed resin. The heavier cloth should be laid over a coat of wet resin and then brushed over with additional resin. If all air bells have been expelled and the cloth sufficiently filled with resin, it will be practically invisible at this point. This first lamination may be followed by any number of successive layers, each being allowed to cure. After the final layer has cured, make an application of resin alone. When hard, sand, using wet paper or garnet cabinet paper, to as smooth a surface as desired for finishing.

Low spots may be filled with small pieces of cloth and resin or resin alone, and then resanded. In some cases it may be easier to form the cloth over a particular area if it is cut

on the bias. Use pins to hold the cloth in place while curing if necessary. When doing repair work remove old dope by sanding and as much fuel as possible with carbon tet.

The second use of F-g as a laminated section allows the fullest utilization of its unusual properties of strength, beauty and ability to form compound curves. The most satisfactory results will be achieved when the piece is laminated in a female mold. Virtually no sanding will be required to secure a fine glass-like surface when using this method. Except for the extra sanding necessary, some time and material may be saved if the piece is laminated over a male pattern. With this method, however, any irregularities in thickness will show up on the surface and require sanding off. When working with a female mold any runs or bumps will be inside the finished piece. But first let us consider the patterns and molds to be employed.

A great variety of substances may be used in making both the original pattern and female mold. Most of the patterns for the plane illustrated were fashioned of soft white pine. The fuselage in this case was to be formed in two halves, so brown paper was glued between the pine halves before shaping (Fig. 2). After the two halves were separated, a strip of wood was fastened around the edge to serve as a tacking strip for the fabric (Fig. 3). Balsa wood could also be used but has the disadvantage of being too easily worked. Casting plaster was used for the center section over the wing, being molded free hand with the wing in place on the fuselage, and then sanded to shape after setting up. Potters clay may be used by making a chunk roughly to shape and quite a bit oversize (about 20% shrinkage), and finishing to size by sanding. Clay, as a male mold, allows the use of undercuts since it may be washed out of the finished piece with water.

Fiberglas itself makes a very satisfactory female mold. It is pliable enough to permit easy release and gives the desired smooth finish to the completed piece. The female mold may also be made of casting plaster or wax.

Wood, plaster and clay are sealed with two or three coats of shellac; allow each to dry *thoroughly* with a light sanding between coats. After the last coat is dry, sand with wet paper.

Since the resin sticks to just about everything, it is necessary to coat the surface of the pattern or mold with a release agent, in order that the finished part may be removed. The release agent used is Garalease #915. This liquid may be brushed or sprayed onto the form and will dry to a Cellophane-like consistency. At least four coats of #915 should be applied so as to provide a complete barrier between the plastic resin and the mold. It is ***absolutely necessary*** that the #915 be dry before proceeding. The spray gun or brush may be cleaned with acetone.

Before mixing the resin plan the lay-up of the fabric to be used, whether for a finished piece or female mold. Avoid lap joints where possible when using the heavier fabrics, and stagger butt joints in each succeeding ply. Leave an ample amount of excess cloth all around which can be trimmed off later. Prepare the mixture of resin and apply a generous coat to the pattern or mold. Lay on the first ply of glass cloth and saturate it with additional resin, working out all bubbles and wrinkles. Succeeding layers are handled in much the same manner, allowing each to cure. The brush is cleaned with acetone before the resin left in it has had a chance to cure.

Whenever working on the outside of a pattern, try to arrange some means of keeping the fabric pulled snug, such as the tacking strip. It will also be found helpful to support the pattern a few inches above the work bench so that both hands may be free (see Fig. 3).

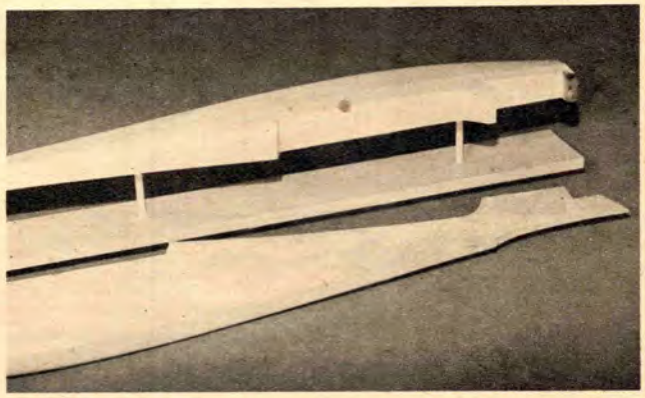
Fiberglas itself makes a very satisfactory female mold. It is cloth. For the fuselage finished part three plies of #108 cloth were used in the area below the rudder. Four plies were used from the rudder to a point under the trailing edge of the wing, and five plies on forward. After joining the two halves an additional layer of boat cloth was laminated into bottom from the trailing edge point to and up the firewall.

Unfortunately the laminated pieces do not release like gelatin from a mold, but must be worked away carefully, first all around the edge and then little by little from one end to the other. The use of an F-g female mold will be helpful in this respect since it may be flexed enough to aid separation. In the case of the motor cowl illustrated a cut was made in the Fiberglas after lamination and then rejoined on the inside with fabric and resin after removal. Potters clay would probably make the best pattern for deep draws where work is to be done on the outside, since it may be washed out with water.

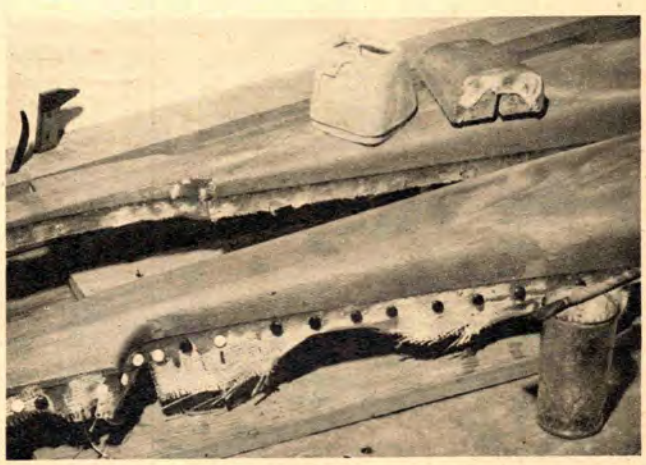
The edge of the pattern or mold will form a bead which can be used as a trim line. Trimming cuts may be made with a razor saw or a thin abrasive disc on a small motor tool. Leave about 3/8" beyond the bead on an F-g female mold, to support fabric used for the finished part, but smooth the bead so that it will make only a faint line on the finished part.

After trimming the two fuselage halves for butt joint, cut bulkheads, if required, and secure in place using resin as glue.

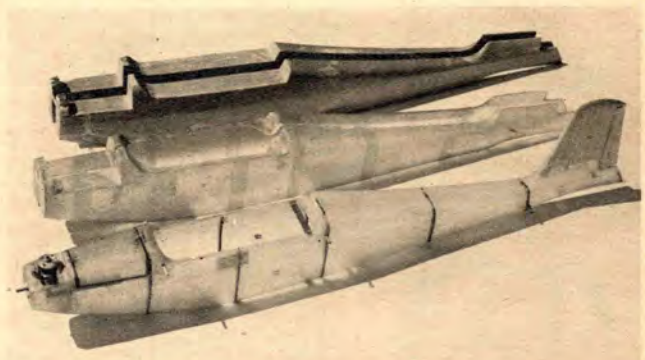
The contour for these may be found by pressing warmed pink dental wax or a heated lucite strip into the shell until cool. Trace around these onto the material being used for bulkheads. Let the ends of the bulkheads extend slightly beyond the edge of the shell to help support and align the two halves while joining. Strips of 108 cut on the bias will readily



Initial step is setting up of each fuselage half which has been shaped in pine. On these Ingham molds Fiberglas forms which in turn serve as female molds to produce any number of copies desired.



Application of first lamination of Fiberglas to wood pattern. A strip of wood three-quarters of an inch thick cut to the same outline as that of the pattern by slightly insetting serves as a tacking strip.



Semi-finished fuselage at front was made on Fiberglas mold (center) which was formed over the wooden pattern. Fiberglas serves as good mold; it is flexible for easy, convenient removal of finished piece.

form around the bulkheads, adding considerable strength (Fig. 4).

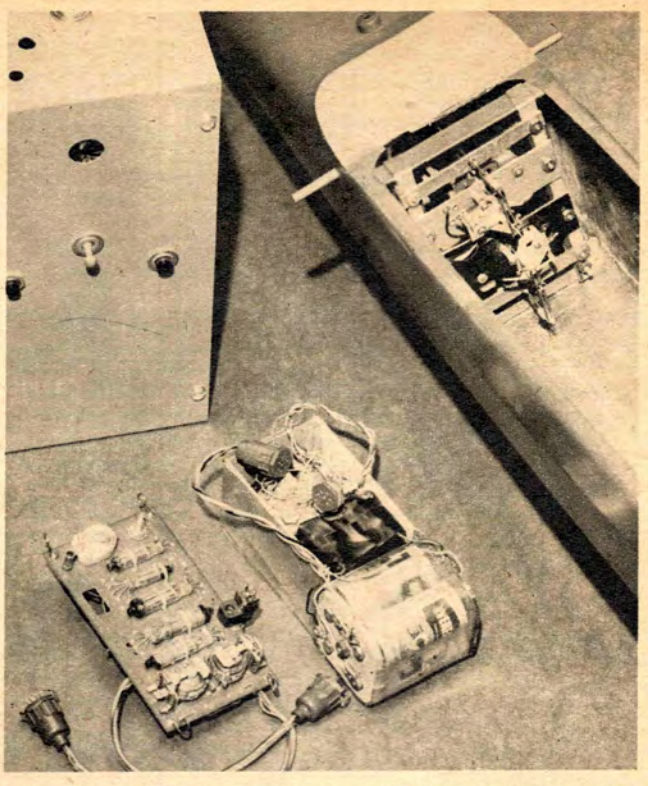
Apply resin to all edges that will touch and press the two sections together. Reinforce this joint with strips of fabric and resin, making each succeeding strip a little wider. After this reinforcement has cured, sand to match the other surfaces. Add several full-width layers to the firewall (Fig. 5).

Fuel-proof dopes have rather poor adhesion to F-g, so if they are desired use a good synthetic automotive primer as the first coat. Allow about twice the recommended drying time.

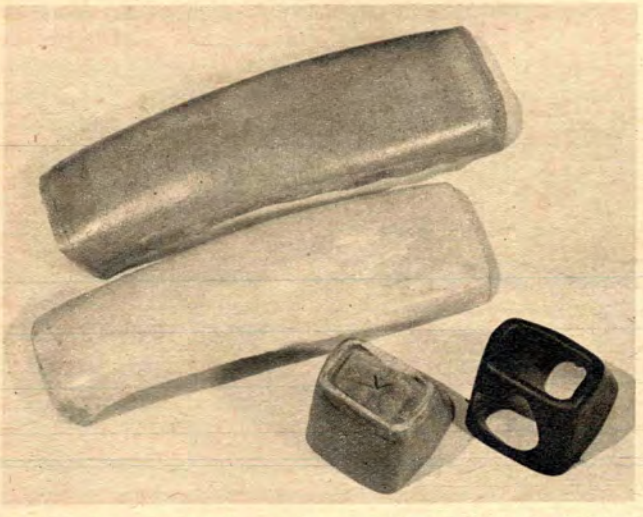
Wire parts may be fastened easily with resin and small pieces of fabric (Fig. 6). Landing gear wire may be fastened this way, or if a shock gear is desired, wrap waxed paper around the wire to form a bearing before applying resin and cloth.

Waxed paper may be used between any pieces which are to fit together but not to be joined. The stabilizer platform was made by covering the stabilizer center section with waxed paper, fastening in place with rubber bands and then laying in the fabric and resin like a fillet.

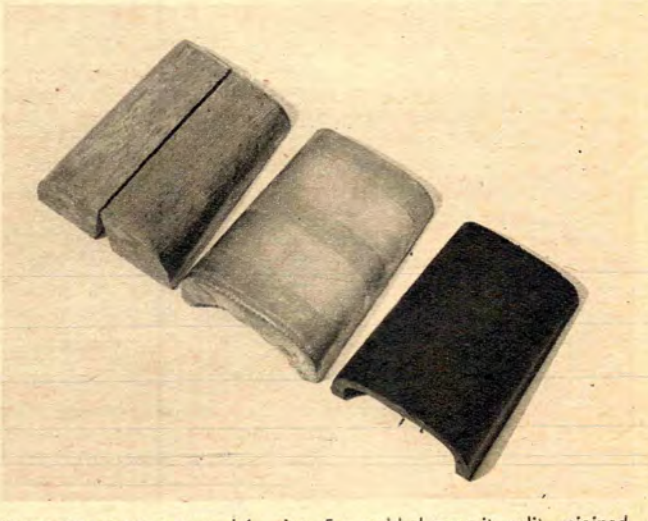
A Fiberglas battery box may be made to fit any number of cells (Fig. 7). First fasten the cells together in the layout desired and wrap with about three layers of waxed paper. Cut a strip of boat cloth an inch wider and long enough to go around the set-up twice. Saturate the cloth with resin, wrap it in place and cover with more waxed paper held in place with rubber bands. After curing, grind the ends square. Cut two pieces of ⅛" plywood to fit inside and drill holes for small oval-headed bolts to serve as contact points. Fasten one end with resin and use long bolts running through to make contact secure. (*Continued on page* 59)



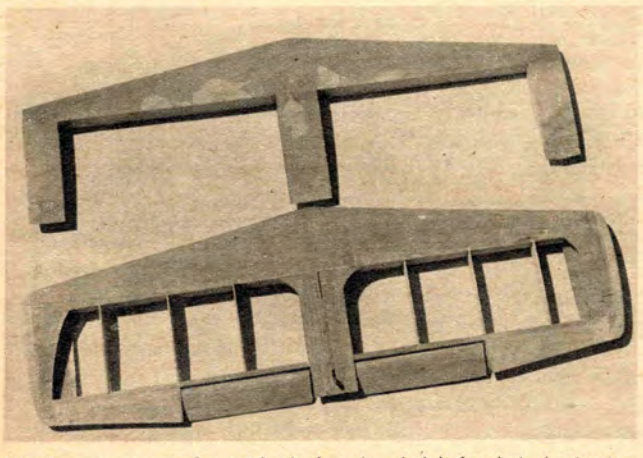
Ingham's six ft. R/C has a Curry receiver which utilizes 5-tube, 2-channel band pass. Bonner escapement for rudder & elevator; motor control used.



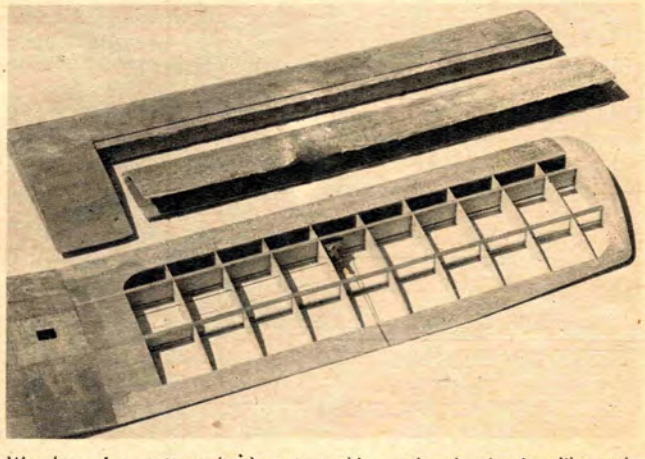
Casting plaster was used as a male mold for the center section over the wing; the scale-like motor cowl was molded over wood form.



Compartment cover carved in pine, F-g molded over it, split, rejoined, then used as female mold. Then any number of copies can be made.



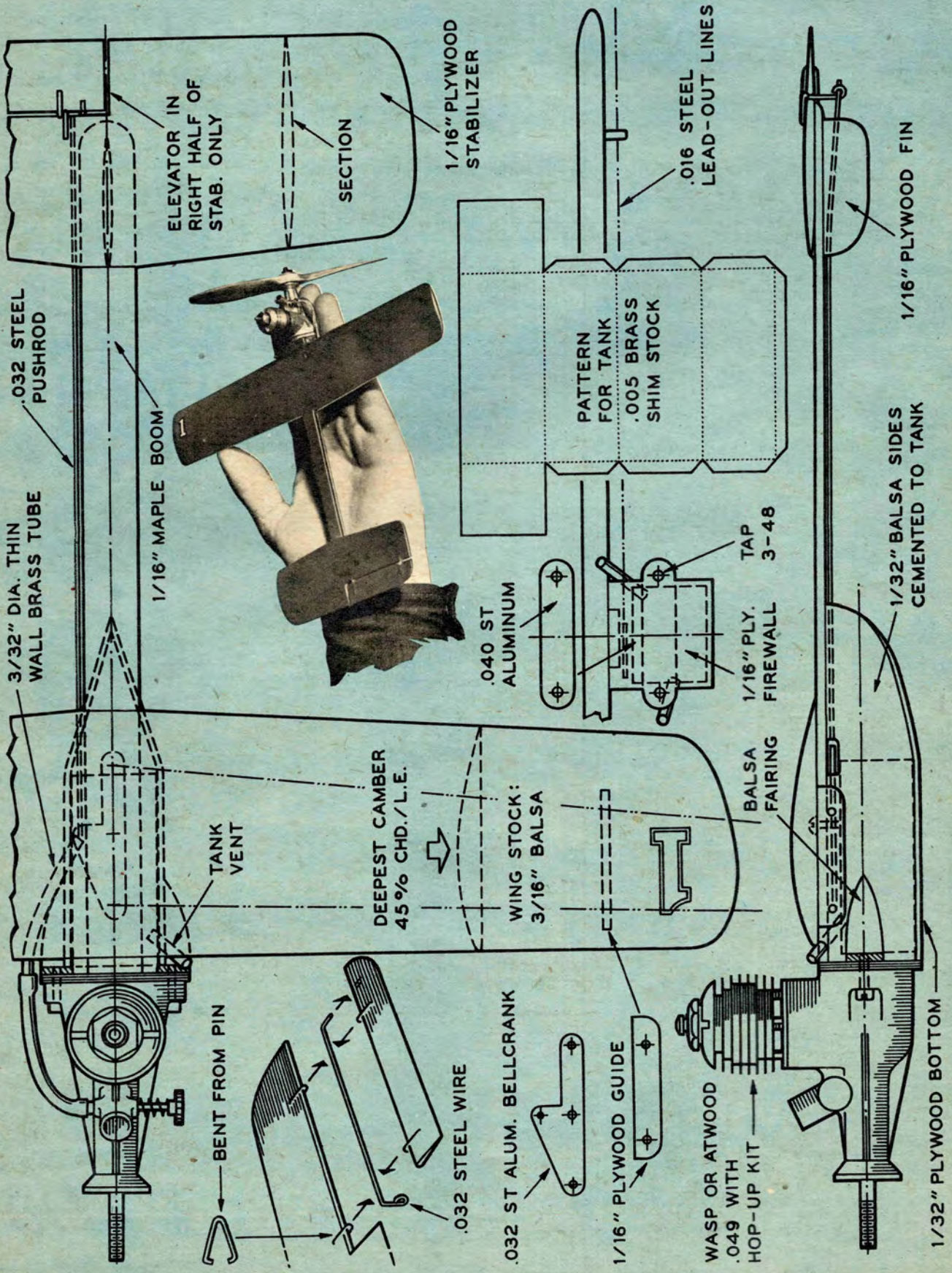
Wooden pattern and semi-finished stab: cloth-balsa-cloth lamination. Spar was tapered to fit, then notched and fastened in place with resin.



Wooden wing pattern (top)—note tacking strip. Lamination like stab. Standard construction except that the sheeting is pre-formed.

■ Launching of Lil' Bomb is by hand. Prop tests should begin with 5/3's; alter blade area and diameter to get best speed. In competition these wee speedsters are flown on 35-foot lines, with minimum diameter of .006 inches where two or more lines are used, and .010 inch where a single line is used.

The author, recently released from the Air Force, was a member of the Sheppard Tailtwisters and placed on the AF World Wide Team two years in a row. Fastest official time with this model was 76 mph in an AF meet. Engine was a stock Wasp. Although it appears ultra-simple more than 3½ years of experimentation is represented in this design. Plans are full size.



BOB DAY'S LIL' BOMB This Half-A hits over 70, mighty fast in the Little League!

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Whirly One

Berkeley Pioneers in Field of Gas Powered Helicopters

■ Flying model helicopters are something most modelers wondered about a great deal, but have had little available in kit form. Berkeley Models (West Hempstead, N. Y.) now makes it possible for the average builder to produce a working glow-engine powered helicopter that may be made to fly forward or backward, hover, climb vertically. Produced in two types from designs developed by Roy Clough, the models differ mainly in the tail fittings and landing gear. The Cloudcopter "TR" (meaning "tail rotor") with a 25" diameter rotor, is the de luxe model, sells for $3.50, and is the one we will discuss.

The 20" fuselage is built up from sheet balsa, all parts for this—and all other balsa parts in the kit, too—being die-cut. A large celluloid "green house" at the nose makes the model look very realistic. Bent wire and rubber wheels in two sizes are provided for the landing gear.

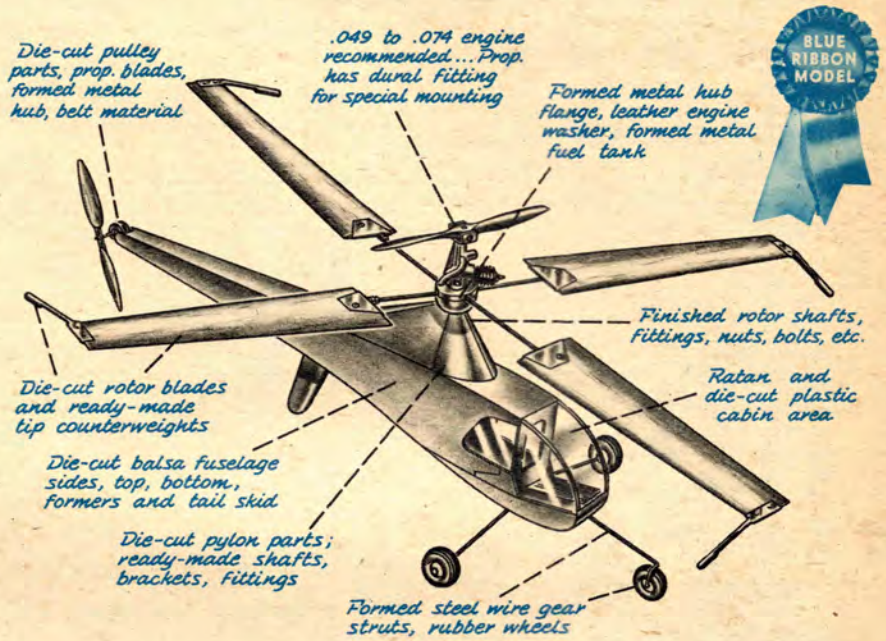
It is the rotor assembly that is of real interest in this model. The main rotor is made up of four blades, and rotates freely on a shaft that is supported on metal bearings in the pylon and fuselage. The rotor head is a metal cup, which, when fitted with a shaped cover, forms a neat fuel tank for the engine.

The rotor blades are held in aluminum clips, and have balance weights at the tips; they are free to turn on their axes to some extent. The engine is attached to the rotor, and the regular engine prop is fastened to the engine shaft by an aluminum bracket. The engine and main rotor thus turn in the opposite direction to the 6" prop. This "TR" model has still another propeller—the tail rotor that is used for steering. It is run from a pulley on the main rotor shaft; direction of steering is governed by how the blades of this rotor are bent, since they are cemented to a flat metal strip.

In any helicopter, the engine has lots of work to do, and this one is no exception, so it is wise to omit doping, leave off the normal crankcase fuel tank (such as comes with Cub engines) and to hold weights down as much as practical.

The model is intended for .049 to .074 engines, and if properly built, will reach altitudes of well over 1000 feet, and will R.O.G. in calm weather.

Many drawings, clear instructions.


BLUE RIBBON MODEL
Die-cut pulley parts, prop. blades, formed metal hub, belt material
.049 to .074 engine recommended... Prop. has dural fitting for special mounting
Formed metal hub flange, leather engine washer, formed metal fuel tank
Finished rotor shafts, fittings, nuts, bolts, etc.
Ratan and die-cut plastic cabin area
Die-cut rotor blades and ready-made tip counterweights
Die-cut balsa fuselage sides, top, bottom, formers and tail skid
Die-cut pylon parts; ready-made shafts, brackets, fittings
Formed steel wire gear struts, rubber wheels

Fast Fellow

Master Modelcraft Launches Three-Point Water Speedster

■ A new entry in the model boat field is being produced by Master Modelcraft (New York 55, N. Y.). Designed after the fashion of the superfast racing speed boats, the 14" long model features "three-point suspension," meaning that at high speed the boat has only three small areas in contact with the water—the two sponsons and the tip of the stern. This is a simple kit, in that all the parts are completely cut, drilled and shaped. It sells for $2.50.

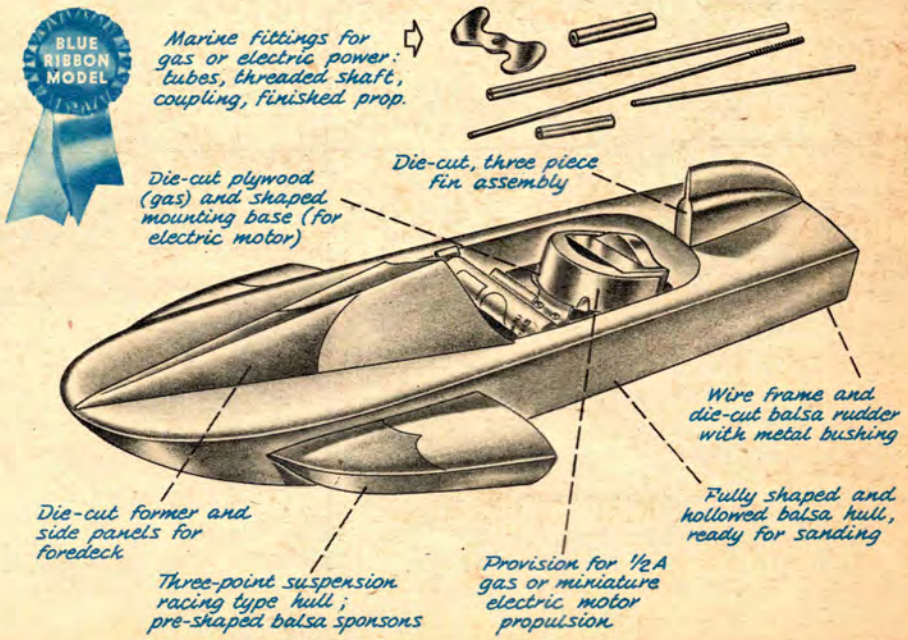
The hull is a single piece of firm but light balsa, and is fully shaped. Several jobs on this piece that the average builder would find really difficult have been neatly done; for example, the cockpit is smoothly hollowed out, and the hole for brass tube stuffing box drilled. The latter task is especially tough for the home constructor to accomplish accurately. The two sponsons are fully shaped and need only to be attached to the hull. Then there are die-cut 1/16" balsa parts to make a nose cowling and a fin at the rear of the cockpit. The rudder is also of balsa.

Either an electric motor or a Half-A engine may be used for power. Needless to say, the latter will enable you to realize the speed capabilities of the boat. For glow engines, a three-ply firewall is furnished; while almost any of the .049 engines could be fitted in, the plans show installation of a Cub. Holes for several other makes of engine are punched in the firewall. The fuel tank is fastened to the floor of the cockpit, in front of the firewall. The kit includes a prop shaft, threaded at the lower end, and an aluminum prop that may be bent for the desired pitch.

Electric power may be installed, with pencells held in a box, for which die-cut balsa parts are provided. Plans show the entire installation for either form of propulsion.

The wooden parts are all very smooth in finish and will need little or no sanding before the finish is applied. Needless to say, the wood should be well treated with filler before the final coloring is put on. Dope or paint may be used, since a bit of extra weight will make little difference.

The plan sheet gives an exploded view of the speedster, and also has two detailed side views, one for electric and one for glow power. Latter two are full-sized.


BLUE RIBBON MODEL
Marine fittings for gas or electric power: tubes, threaded shaft, coupling, finished prop.
Die-cut, three piece fin assembly
Die-cut plywood (gas) and shaped mounting base (for electric motor)
Wire frame and die-cut balsa rudder with metal bushing
Fully shaped and hollowed balsa hull, ready for sanding
Die-cut former and side panels for foredeck
Three-point suspension racing type hull; pre-shaped balsa sponsons
Provision for 1/2 A gas or miniature electric motor propulsion

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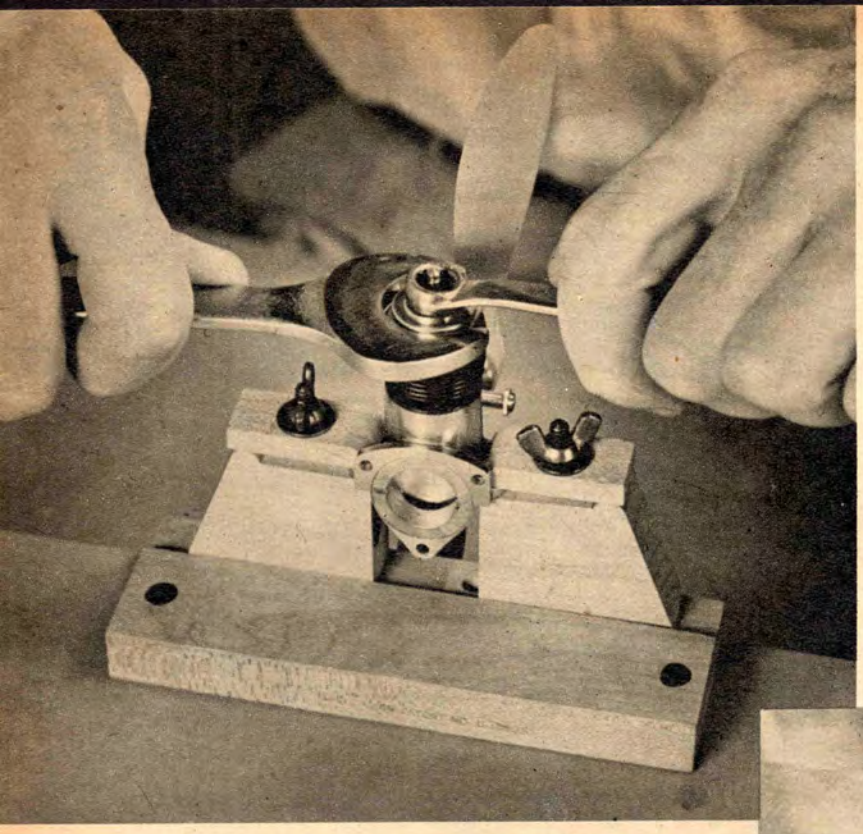
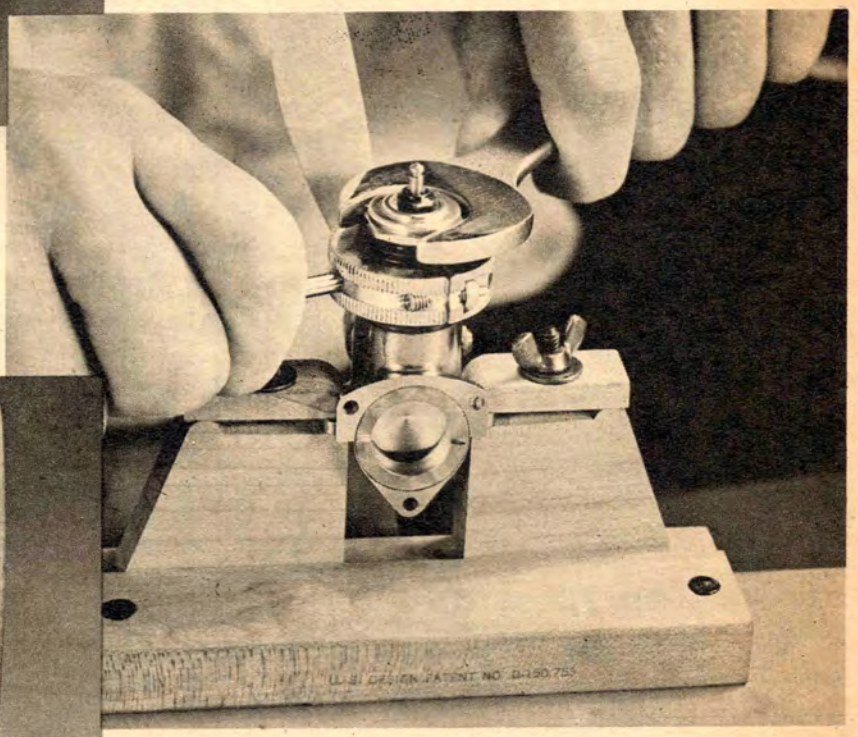
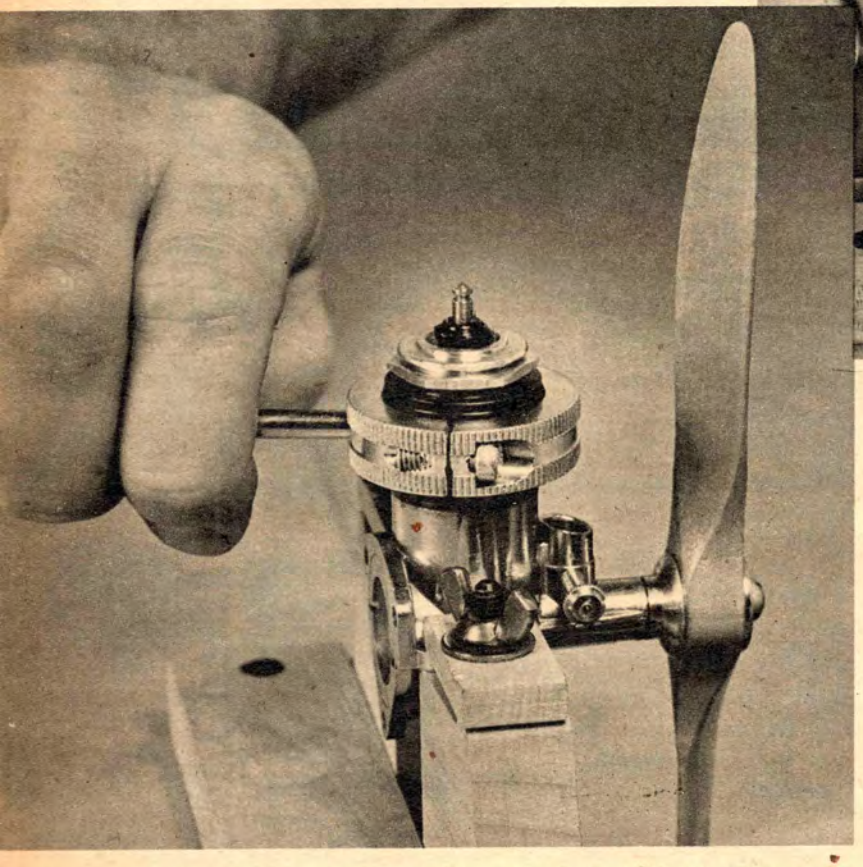


Proper method to remove glow plug: hold engine assembly by gripping cylinder head firmly with open-end wrench, turn plug wrench counter-clockwise.



To remove cylinder head, have piston in bottom-most position. This prevents damage to piston and con rod assembly. Hold clamp ring, turn head counter-clockwise.



To remove cylinder, tighten clamp ring around cylinder and insert ring handle. Turn clamp ring counter-clockwise. Before starting be sure piston is in bottom-most position.

■ Wherever a modeler goes to fly, he usually takes along plenty of propellers, glow plugs, fuel and batteries. Too often, though, he forgets to bring along—or even to own—the right tools to keep his engines flying. Be sure your tool box includes these three all-important items: (1) box wrench for removing glow plugs, (2) standard open-end wrench for removing cylinder head, (3) a cylinder clamp ring to unscrew engine cylinder. *Never use pliers!* Hurry-up repairs with a pair of pliers can ruin your engine. Keep it looking slick, running flawlessly at its highest rate of RPM's, without being troubled by mashed gaskets, lost compression or battered threads, with those three tools.

In operation above clamp ring is tightened around cylinder, then the clamp ring handle is inserted. Reassembly of the cylinder (left) is just a matter of reversing removal directions. Tighten cautiously, make sure cylinder gasket seats correctly. Over-tightening causes cylinder distortion and impaired performance.

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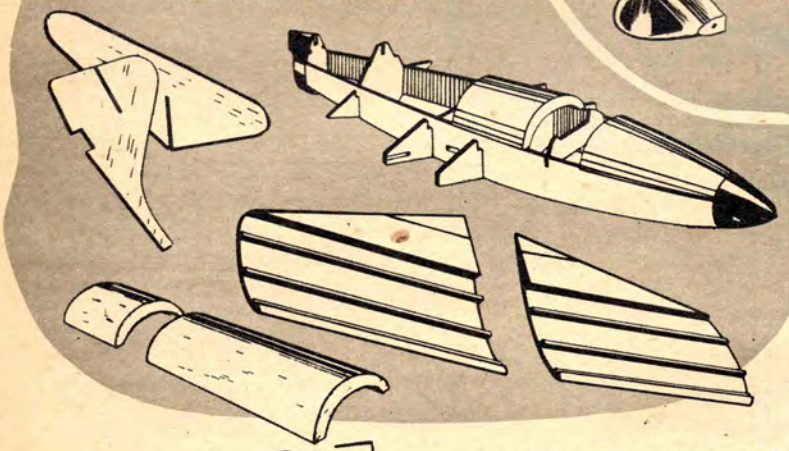

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X-Pendable

(*Continued from page* 33)

wing rib template and lay out wing cut-out section on both sides of fuselage. Be sure they are in line by measuring down from the top flat sides of your fuselage with a rule or scale. This should be double-checked for accuracy! Carve out wing rest and fit wing. Pin in place and measure to center of leading and trailing edge on both sides of fuselage to be sure wing is centered properly. Misalignment here would ruin the whole project. Take wing out and add a bead of glue to mating point, and re-set wing. Pin well into place and allow to dry. Check again before glue dries. When dry, add a few light coats of glue to wing mate area inside of fuselage, then one heavy coat.

Install tank; trim out a square where breather vents extend from fuselage. When tank is set, securely braced and cemented, fit removed square back into position and smooth off any irregularities. Add ⅛" medium-hard balsa reinforcement block at stabilizer and sand smooth. Insert the 1/16" plywood reinforcement for the tail skid as shown. Sheet the bottom as shown on drawing, filleting in. Insert the pushrod and solder firmly, checking to see if clearance is O.K. Work controls vigorously to check freeness of control action. Note clearance on former #4.

Add the dowel reinforcements through the horizontal stabilizer and ⅛" reinforcement. Insert tail skid as shown, being careful not to cut through the plywood backer illustrated on plan view. Install soft wire tail and skid cap and glue well. Add top fuselage reinforcement block just above spar (shown on plan view). Shape and hollow out top block as shown and fit into place. Sand to shape and add cockpit hole. Cover this and bottom of ship with silk or Silkspan after having thoroughly sanded and filled same. Install drain tube. Add two or three coats of filler over paper (or silk)

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laps and lightly sand smooth.

Carve out headrest, cover with paper, and glue in place. Fillet around edges with glue. Check for any irregularities that may appear and sand lightly out. The rudder may or may not be covered depending on the builder but seal it fully and sand to a smooth finish before cutting slot in fuselage top. Add rudder and fillet glue around it. Dope the whole fuselage two or three times with thin coats of dope or until a good finish is apparent and you are practically in business.

The paint job was a super-quickie. The model was sprayed with two light coats of Aero Gloss (beige) color. Cub Orange was then shot along the leading edges of wing, stab, rudder and fuselage as indicated in the pictures. No masking tape was used with the exception of that covering the fuel vents, and just enough to hold a newspaper covering over the landing gear and wheels. Cut a slot for the windshield and insert. Add a fine line of black paint around the glue line. Paint headrest black. Regular colored model dope may be applied and a coat or two of fuel proofer added if desired. Any engine from a .19 through the .35 class may be used for power. Might even cram in a larger powerplant if you wish. Prop we used on original model was a 10/6 Tornado with each tip trimmed ½".

For deviations from the plan, the engine may be installed in the inverted position. If this were done, we would lengthen the gear about ¾". For inverting, the motor bearers should be shifted so the thrust line aligns with that on the plan view. We have both upright and inverted types built and flying, and each handles beautifully.

The top fuselage block should also be extended and contoured out to form the streamlined look. For those of you who don't like the cockpit, a bubble type canopy can be easily installed.

The plan view shows the Torp .29 with

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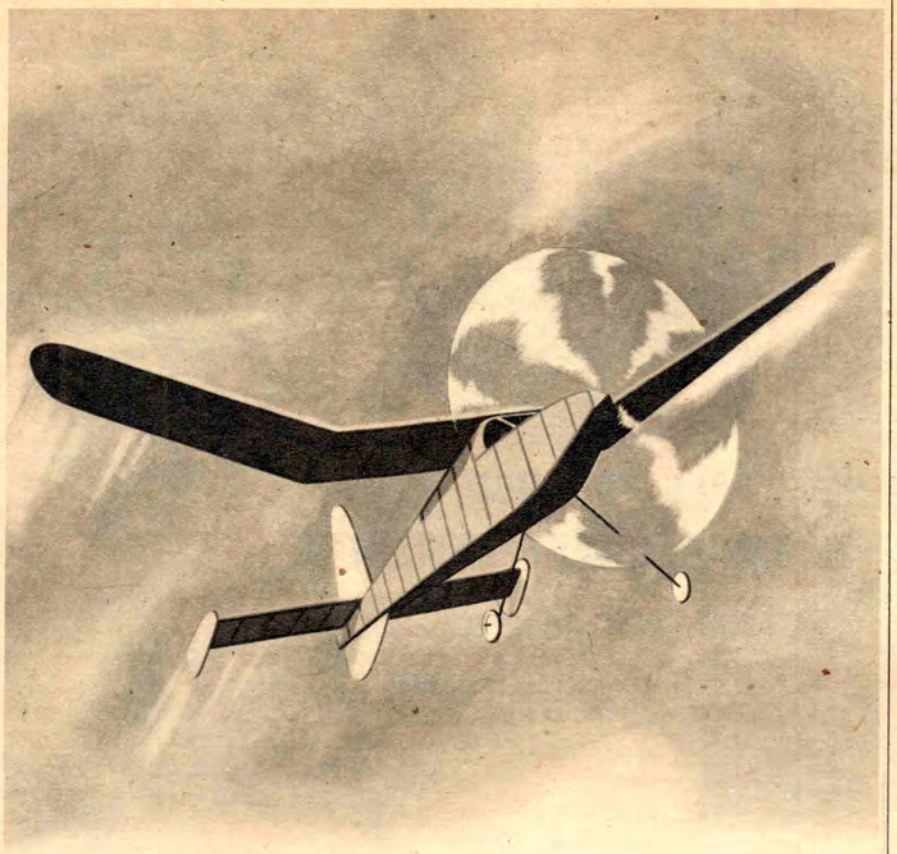

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a McCoy .29 extension added. The radial mount shows a stock Torp. The completed ship ready to fly weighs just under two pounds. Don't worry too much about the weight as a few more ounces one way or another will not affect the flight characteristics at all.

Bill of Materials

1 pc. 1/16" diameter wire. 1 pc. ⅛" diameter wire. 2½ sheets 3/32" x 3" x 36". 1½ sheets 1/16" x 3" x 36". 1 pc. ¼" square (hard) 36". 1 trailing edge ¼" x 1" x 36" med. hard. 1 pc. 3/16" x 3" x 36" med. hard. Plywood for two firewalls as shown. ½ sheet med. hard ⅛" x 3". 1⅜" sq. x 36" spruce or hardwood spar. 2 ⅜" sq. hardwood motor mounts as shown. 1 crank and horn. 1 pc. 1/16" I.D. aluminum tube or 2 eyelets for wing guide. 2 wheels 1⅞" or 2". One ¾" x 2½" x 21" balsa block for fuse top. 2 soft balsa wing tip blocks (from scrap box). Tank material as shown.

Blunderbus

(*Continued from page 27*)

and build directly over plan view. Pin down leading, trailing edges and spar. Rib spacing is identical for both wing halves, so both panels can be made over same plan. The two center ribs should be very hard balsa or plywood since the wing hooks are attached here. Bend hooks as shown in the drawing and stitch and double-cement to ribs. These hooks are used in connection with the wire mount only, and of course can be omitted if you are building the pylon mount. Wing hold-down with wire mount consists of a rubber band triple-looped over wing hooks and passing under center wire mount pieces.

Join wing halves with plywood spar joiners, add corner gussets, cover leading edge and add tips. Carve and sand edges to complete wing. The bottom wing surface from center out to third rib is covered with sheet celluloid to provide a strong surface to bear against wire wing mount.

Tail surfaces are sheet balsa, the stab having a thin lifting section. Ribs are cemented to underside and center section is filled in with sheet to form a flat surface where stab rests on stab platform and tail. Cement a strip of silk over leading and trailing edges of stab at center where hold-down rubbers pass over surface.

Fuselage is finished with fuel-proof dopes, several coats of sealer can be used or wood can be covered with lightweight tissue for evtra strength. Wing is covered with tissue and given several coats of fuel-proof dope. Tails are simply doped to save weight.

Since the model has such a short nose, the heavier Half-A engines are preferred to achieve balance. Wheels can be lightweight 1¾" or 2" depending upon weight needed to make model balance. Wing has only 2 deg. positive incidence and stab is at 1 deg. negative incidence. Balance point is about at large arrow on plan. Naturally this will vary with individual models and can only be proven by test flights.

The original model used about 1½ deg. to 2 deg. downthrust and right thrust. Rudder tab was deflected about 1/32" to right. This trim set-up gave a shallow left climbing turn with wide right glide turn. Remember, the open parasol wing mount gives left power turn tendencies. Fuel tank is a coil of tubing for limiting engine run fastened to fuselage side. A starting tank may be installed inside fuselage or held on outside. Fuel line coil is then pulled off tank upon launching.

Bill of Materials

3 pcs. 1/16"x3"x36", fuselage sides, formers, wing ribs, tails, wing leading edge. 3 pcs. 1/16"x⅛"x36", longerons. 1 pc. 1/32"x 3"x18", fuselage top and bottom. 1 pc. ¼"x ⅜"x36", leading edge. 1 pc. ⅛"x⅜"x36", spar. 1 pc. 3/16"x½"x36", trailing edge. 2 pcs. .040" dia.x36" wire, wing mount struts. 1 pc. 3/32" dia.x4¼" wire, landing gear.

Scrap pine and plywood, 2" dia. wheels cement, dope, tissue.

Air Trails RADIO CONTROL MODELS

"WHO YOU KIDDIN'?"

By HERB FEDERBUSH

■ Friend of mine said, "Now you go over to this field, see? You'll see these guys flying model airplanes. By radio." "By what?" "Radio." "Who you kiddin'?" "No one. Why don't you go over and take a look?"

I did. And heaven help me, there were these guys—grown men—flying model airplanes. Making myself as inconspicuous as possible, I sort of sidled over to these characters. First thing I noticed about this business is if you want to fly planes by radio control, you've got to buy a car. With a trunk. One end of this field was lined up with cars and everybody's trunk was wide open. Looked like 15 guys with flat tires. Some of the fellows were fiddling around with these big little planes but most of them seemed to be spending the afternoon in their trunks. Crazy as hoot owls, I told myself.

I ambled over, gradually, to one chap who was deep in the back end of his Chevvie. "Are these planes supposed to be radio-controlled?" I asked. "Supposed to is right!" he said, and his bitterness appealed to me. These guys must be human after all.

Then he took what looked like an ordinary drill and started winding up a long rubber band at the tail of his plane. "I thought these things are powered by motors," I said, proud of this little nugget of knowledge. He looked up at me like my hobby was stamp-collecting.

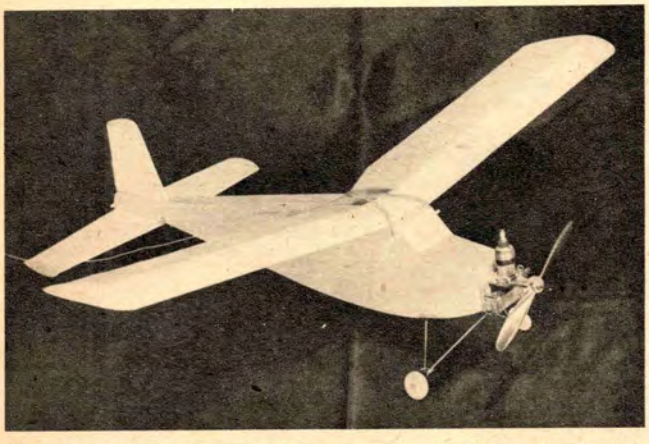
I moved on to another guy who was giving his ship what looked like a penicillin hypodermic to me. "That keep it from getting airsick?" I cracked. He didn't even know I was alive.

At that moment two F-84 Thunderjets tore low across the sky and kicked up a terrific racket practically overhead. Me, I'm normal and I looked up just like anybody else would. But what do you think those air-model guys did? Not a darn thing. They kept right on tinkering with *their* planes, didn't so much as glance at the jets. I got the impression there's no doubt about it, the real thing is models. You see, Mac, *anybody* can fly an F-84.

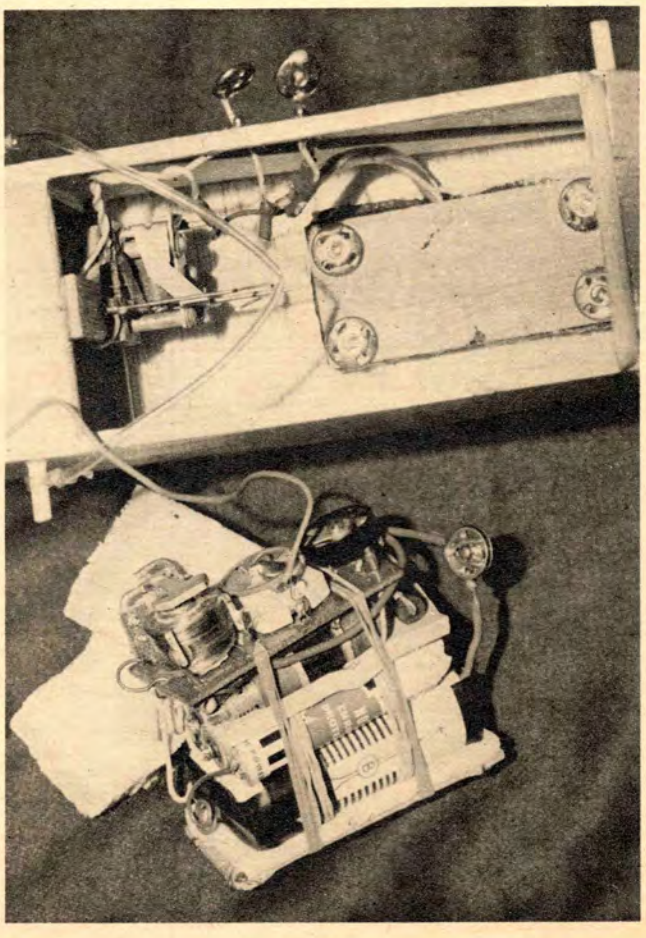
Finally, one guy started running down the field, holding a plane up in his hand, just like I used to fly a kite. The plane sounded real loud and business-like and when he let it go it was airborne and I was surprised. It was flying very nicely, buzzing along and turning this way and that. Then this fellow with the button—now get this—this fellow with the button tells me he's making his ship turn whichever direction he wants by *radio control!*

How about that? Here's this guy I never saw before in my life trying to pull a fast one like that. Flying toy planes by radio, indeed! I wasn't born yesterday, you know.

We couldn't work this into Ingham's article on Fiberglas for R/C models but just had to include it in the issue. Ivan Nash is demonstrating the fine art of model launching.



More by Ingham. . . . this job spans a mere 27 in., weighs but 9 oz. with batteries! Rearranged Aerotrol receiver, Neomatic relay, Bonner standard escapement. "Flights have been witnessed," says J. I. Does he get record, or haven't you something smaller?



Air Model Manual: Most Frequently Asked Questions on R/C

■ Though they are interested in radio control, many modelers may hesitate to enter this field, as they know nothing of the problems involved; they are afraid to tackle something that is entirely strange to them. By presenting a series of questions—the same sort that are received over and over again at its editorial offices—Air Trails hopes to clear up some of the mystery that surrounds radio control. Let's get right into them, and see what this R/C is all about.

General

Question—What is radio control?

Answer—Radio Control (or R/C for short) is simply the directional guiding of a model. In the case of model airplanes, you move the rudder for steering; you can also control the height of the plane to a certain extent, since by proper use of the rudder the model may be made to spiral dive—thus losing altitude.

Q—How old is it?

A—R/C has been quite active in model circles since about 1938, though light planes were guided by radio during World War I. R/C really started to forge ahead after the last war, when several new concerns entered the field to supply equipment.

Q—How did it get started?

A—Some of the earliest experimenters used large gliders equipped with controllable rudders. Real impetus for R/C development was probably the addition of the R/C event to the Nationals in 1937.

Q—How big is it today?

A—Estimates of annual R/C sales in the U.S. at the present time range from $750,000 to $1,250,000. This is for sales of equipment kits, plane and boat kits, ready-to-use radio apparatus, parts, etc., intended solely for R/C use.

Q—How big will it be tomorrow?

A—This is one for the crystal ball! However, new concerns are entering the R/C field almost weekly, and we have certain knowledge of many others getting ready to do so. At least a dozen major companies introduced R/C model kits, new equipment or accessories in the first half of 1953. R/C was the big interest at the last model industry convention in Chicago.

Q—How old is the average radio control modeler?

A—Much older than the average modeler in general; perhaps about 30 years old. This doesn't indicate lack of interest among the younger modelers. It's just that up to now R/C costs run high compared to other modeling categories. As the manufacturers can expand sales, costs will drop, and the average age will drop.

Q—How much money does the average R/C modeler spend?

A—On an annual basis, probably $150. His models last longer, and he doesn't build as many. He has higher battery and fuel costs, latter due to long motor runs on each flight.

Q—What is the average investment for the beginning R/C flyer?

A—Assuming he buys a kit model and a new engine for it, and has to purchase everything in the radio line brand new, he can start for as little as $60. For more complex apparatus, this might be doubled or even tripled. The first figure will get him a plane of about 4½ ft. span, an engine around .09-.15, a receiver and transmitter kit, escapement, all tubes and batteries, test meter.

Q—What months out of the year does he fly?

A—Some of them fly *all* year, even in cold weather. Many spend their winter time building. Expenditures during flying season are more for batteries, fuel, tubes, other "maintenance" items.

Q—Are there any radio control clubs?

A—There are a good many, and more coming all the time. Many general model clubs have R/C groups that meet separately from the regular club meetings.

Q—Is radio control an internationally recognized sport?

A—It surely is. The F.A.I. has a whole series of record classifications for R/C—such as endurance, speed, altitude. Several R/C meets have been held in England and on the European continent in which flyers from half a dozen or more countries participated. The first regular "International Model R/C Meet" will be held in England early this fall. It is expected that those interested in R/C boats will soon follow suit.

Q—Is it possible to radio-control working toys?

A—In addition to planes and boats, we have seen R/C cars, caterpillar tractors, tanks. R/C may be applied to any sort of working model or toy, as long as there is room enough for the equipment and batteries.

Q—What books are there on radio control?

A—At present there are only three that are of much use to the novice: "Radio Control for Models" ($2.98, Gull Model Airplane Co., Baltimore 6, Md.); "Model Control by Radio" ($1.00, Radcraft Publications Inc., N. Y. 7, N. Y.); "Radio Control for Model Aircraft" (50¢, Polk's, N. Y. 1, N. Y.). In addition, some of the makers of R/C equipment sell their instruction books separately, and these have much useful information in them. Several more R/C books are due shortly.

Licensing

Q—Do you have to be a licensed radio amateur to participate in R/C?

A—You do not, but you do have to have a license to operate *any* sort of radio control transmitter.

Q—Who issues such a license?

A—All transmitting licenses are issued by the F.C.C.

Q—Where do I apply for such a license?

A—At the nearest F. C. C. office to your home. Field offices of the Federal Communications Commission are located as follows:

ALABAMA—419 U. S. Court House & Custom House, Mobile 10.

ALASKA—Room 52, Federal Building, Anchorage; Room 6, Shattuck Building, Corner Third and Seward, Juneau.

CALIFORNIA—539 Federal Building, Temple and Spring Streets, Los Angeles 12; 323-A Customhouse, San Francisco 26; 15-C U. C. Customhouse, Union and F Streets, San Diego 1.

COLORADO—521 New Custom House, Denver 2.

DISTRICT OF COLUMBIA—415 22nd Street, N.W., Washington 25 (Corner 22nd and E).

FLORIDA—312 Federal Building, Miami 1; Room 410, Post Office Building, Tampa.

GEORGIA—411 Federal Annex, Atlanta 3; 214 Post Office Building, York and Bull Streets, Savannah (P.O. Box 77).

HONOLULU, OAHU—(Hawaiian Islands) Room 609, Stangenwald Building, 119 Merchant St.

ILLINOIS—1300 U. S. Court House, 219 South Clark Street, Chicago 4.

LOUISIANA—400 Audubon Building, 927 Canal Street, New Orleans 16.

MARYLAND—508 Old Town Bank Building, Gay Street and Fallsway, Baltimore 2.

MASSACHUSETTS—1600 Custom House, Boston 9.

MICHIGAN—1029 Federal Building, Detroit 26.

MISSOURI—3200 Federal Office Building, 911 Walnut Street, Kansas City 6E.

MINNESOTA—208 Federal Courts Building, 6th and Market Streets, St. Paul 2.

NEW YORK—328 Post Office Building, Ellicott and Swan Streets, Buffalo 3; 748 Federal Building, 641 Washington Street, New York 14.

OREGON—307 Fitzpatrick Building, 917 S.W. Oak Street, Portland 5.

PENNSYLVANIA—1005 U. S. Customhouse, 2nd and Chestnut Streets, Philadelphia 6.

PUERTO RICO—323 Federal Building, P. O. Box 2987, San Juan.

TEXAS—329 Post Office Building, Box 1527, Beaumont; 500 U. S. Terminal Annex Building, Corner Houston and Jackson Streets, Dallas; 324 U. S. Appraisers Stores Building, 7300 Wingate Street, Houston 11.

VIRGINIA—402 Federal Building, Norfolk.

WASHINGTON—808 Federal Office Building, 1st Avenue and Marion, Seattle 4.

Q—I've heard my friends say they fly on a "license-free band"; what is this?

A—There is no such thing as a license-free band. What they really mean is *examination*-free. While you have to have a license in some cases, there is no examination for it—on certain frequencies designated by the F. C. C. for this use, you just fill out a simple form and mail it in to them. What you get back is a Station license, good for use with any transmitter you may wish to use, as long as it complies with the simple rules.

Q—What are the channels or frequencies used for R/C?

A—Most widely used now is 27.255 mc., the lower examination-free spot. There is another at 465 mc., but here you must use an approved transmitter (there is one on the market at present) and you can't make your own. R/C is possible on any of the amateur bands, but the most widely used is the 50-54 mc. band. Here you need both a Station and an Operator's license; for the latter you must pass a code and technical exam.

Q—Can I fly on 27.255 mc. if under 18 years of age?

A—Yes, but you can't get a license for this spot; what you do is to have a parent or older friend get a license and allow you to fly on it. On the other hand, there is no age limit on amateur licenses, so a holder of one of these can fly on his own legally, regardless of age. However, licensed amateurs cannot fly in the "Citizens Bands" (27.255 and 465 mc.) unless they also have the license for these bands.

Q—How much does an F.C.C. license cost?

A—There is no charge, but you have to have the license notarized before you send it in. There is usually a 25¢ local charge for this.

Q—How long is a license good for?

A—Licenses for 27.255 and 465 mc. have no time limit. Regular amateur licenses are good for 5 years, and may then be renewed.

Q—Do you need an AMA license to fly R/C?

A—No, but it is necessary to have one if you wish to fly in an AMA-sanctioned R/C meet.

Sources of Supply

Q—Who are the major manufacturers of receivers and transmitters?

A—Berkeley, Macnabb, Control Master, Babcock, North American, Polk's, American Telasco, Rockwood, Schmidt, Philmore.

Q—Who are the major manufacturers of relays, escapements, and other R/C accessories?

A—Berkeley, American Telasco, Sigma (Polk's) E. D. (Polk's), Bonner, Macnabb, Essco.

Q—Who makes crystals?

A—Satisfactory crystals for R/C are made by Petersen Radio Co., Council Bluffs, Iowa; Valpey Crystals, Hollis-ton, Mass.; Bliley Electric Co., Erie, Pa.; Precision Crystal Labs., Santa Monica, Cal.

What Model to Use for R/C

Q—Who makes plane kits expressly for R/C purposes?

A—Berkeley, Guillow, deBolt, Ray Morgan.

Q—Can any existing free flight model be converted to R/C?

A—Yes, but many of them are not practical for one reason or another. A radio plane needs plenty of cabin space, a husky landing gear and nose section, ability to carry a fairly heavy load at reasonable speeds, moderate dihedral. Many high-performance free flight models do not qualify well in these respects.

Q—What size plane and engine should the beginner use?

A—A plane of 4 to 4½ ft. span with an engine .09-.14 cu. in. will be best. They are rugged, easy to handle, low in cost. Leave the very small or big jobs to the experts. Also the high powered jobs!

Q—What covering material is best for R/C models?

A—If the framework will stand it, by all means use Nylon. Lightweight silk is good for the smaller planes that can't take Nylon. Don't use paper; it has less strength than the lightest fabric and you will spend most of your time repairing it.

Q—What weight limits should be followed?

A—Radio planes are generally much heavier than the equivalent size of free flighter. A 4½ ft. plane will fly well at 3 lbs., a six footer at 6 lbs. or more. Planes that are too light for their wing area are too jumpy and hard to handle, especially if there is much wind. They climb too much in the wind and float too much when brought in for a landing.

Q—What wing loading do R/C's usually have?

A—About a pound per square foot of area is probably average.

Q—How about power?

A—This is harder to pin down, but .049 to .065 are general for 3½ footers, .09-.14 for 4 to 4½ ft., .19 for 4½ to 5 ft., .29 to .35 for 6 footers.

Q—Must a radio model be first of all a stable free flighter?

A—It certainly should, especially if it is your first attempt. Forget the idea that you can keep any old plane aloft—whether it is stable or not—by just fitting R/C!

Q—Should I use rudder, elevator and motor control in my first ship?

A—Generally speaking, no. You will find it tricky enough to master rudder alone, so that you can fly smoothly and competently. When you have done so, *then* is the time to consider additional controls.

Q—Are model gliders practical for R/C?

A—They are ideal if you are in an area where you can do a bit of slope soaring. Glider R/C presents lots less problems due to absence of motor vibration, fuel proofing, long landing gear to clear prop, etc.

Q—Are ignition engines usable for R/C?

A—Yes. With some receivers it might be necessary to isolate the ignition parts from the receiver, or to put a "suppressor" resistor at the spark plug. Ignition engines are preferred by some R/C flyers, due to the ease with which they can be stopped, or made to change speed (particularly if equipped with 2-speed points, which are available for a few engines).

Q—Do radio control models need a larger area in which to operate than free flight jobs?

A—Generally much less, since you can control direction and altitude. You are much more certain of keeping the R/C plane within bounds, especially if there is any wind blowing.

Equipment Problems

Q—What is a relay?

A—This is the unit in the receiver that transfers a tiny current change in the tube to a large power change capable of moving the rudder or other control element.

Q—What is an escapement?

A—This part transfers electrical power (controlled by the relay) to mechanical motion for actual movement of the control surface. It is usually driven by a rubber band.

Q—What is a beep box?

A—This a motor-driven control used at the transmitter to send out pulses to an escapement in the plane. Many escapements must be operated in a fixed sequence, like: neutral-right-neutral-left-neutral-right . . . etc. The beep box sends out the necessary pulses, so that the flyer doesn't have to remember the escapement sequence.

Q—What is crystal control?

A—The frequency of the transmitter is held steady by a quartz crystal. Transmitters that do not have this feature can accidentally be tuned to the wrong frequency. Most transmitters today are crystal controlled; those on the 27.255 spot must be.

Q—What is MOPA?

A—This means "master oscillator-power amplifier," a form of transmitter with at least two tubes in it. This type of transmitter is exceptionally stable and unaffected by outside factors that can render a plain crystal oscillator unworkable.

Q—What is the major difficulty with faulty transmitters?

A—Probably improper tuning, if all parts are workable, and the batteries good.

Q—What is the next most troublesome difficulty?

A—Weak batteries.

Q—Is it possible for a transmitter or receiver not to work, even though all parts are in good order?

A—Yes. The two may not be tuned to each other correctly. The transmitter may overload the receiver, if the two are too close. Or there may be interference on the control frequency.

Q—What is a hard tube receiver?

A—A set that uses one or more "hard" tubes, as opposed to those using "gas" tubes. Hard tubes are highly "evacuated," like those in your home radio receiver.

Q—What is a gas tube?

A—This is one that has had a small quantity of inert gas put in it after all the air was pumped out. Such tubes are widely used in R/C, give fine results with the simplest circuits, but are more fussy than hard tubes and have shorter life. They are more expensive.

Q—What is the major trouble with faulty receivers?

A—If of the hard tube type, probably incorrect "sensitivity" adjustment. If a gas-tuber, suspect an aging tube.

Q—What is the next most troublesome difficulty found?

A—Probably relay trouble of one sort or another; either incorrect setting, dirty contacts, vibration due to improper mounting, etc.

Q—What is proportional control?

A—This is a form of control system where the rudder closely follows the control stick or knob in action. There is no sequence as with an escapement. If the knob is moved a little, the rudder moves only a little. This is the nearest you can get to the degree of control that is available in large planes.

Q—What is tuned reed control?

A—This is the most practical and lightest way, at present, to get multi-controls on a model. The transmitter sends out audio tones that actuate vibrating reeds in the plane. It is possible to have five or even more of these reeds, each for a separate control function.

Q—What is audio tone control?

A—Generally considered to mean use of a single audio tone, rather than multi-tones as in the reed systems. It is more complex than the average R/C system, but requires much less transmitter power and is less affected by interfering signals.

Q—What is a compound escapement?

A—One that does not have to be operated through a sequence. In other words, you can get as many lefts or rights as you want, without going through the unwanted positions. Some of these compounds have built-in contacts to operate other control functions, through an additional escapement.

Q—What is two-speed control?

A—A system of varying the engine RPM at will, to any two speeds that have been pre-set. Usually they are top speed, and a much lower speed that allows the ship to glide downward while still keeping the engine running. Change between the two speeds may be made at will by radio.

Q—What is a frequency meter used for?

A—To check the transmitted frequency; also to check the receiver during tune-up operations.

Q—What is a field strength meter?

A—This unit shows how much radio frequency output is coming from the transmitter. It gives an indication of the actual signal that is going out to work the receiver, thus acting as an overall check on the batteries, tuning, antenna efficiency, etc. Some of them also act as frequency meters as well.

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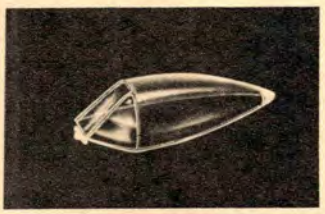

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R/C MODELS

NEWS AND COMMENT BY HOWARD McENTEE

■ **Proportional Control Rudder Release.** Most users of proportional control don't worry too much over the possibility of a system failure putting their ship into a hard turn to right or left. And not many of them (yours truly included!) have any sort of safety release system for such an eventuality. But the idea does have merit, and here this month is a simple arrangement that should do the job. It was suggested by PFC Robert Dickerson, who freely admits he hasn't tried it—he is a compound escapement flyer himself.

It consists of a thermal cut-off that would be actuated by contacts on the rudder (or they could be tripped by the linkage, or by the actuator arm itself). The rudder is set so that it does not normally move through the full distance possible, by limiting the motion of the control stick; rudder linkage and area are chosen to give the desired degree of turn with this restricted motion.

Any failure in the entire receiving system would then put the rudder hard over to either side, and if held there for more than a few seconds—the time delay to be chosen so that gusts or other factors that might make the rudder flap over for just a second would not operate the release—the actuator circuit would be opened. A catch might be provided to hold the thermal strip open, once it had operated. For additional safety, the strip could be made to trip another set of contacts that would kill the engine.

The idea also has possibilities for operating a motor control escapement, etc. Bob is currently a displaced person (by Uncle Sam) and is located in France. He has been unable to get fuel shipped to him, so is not flying his planes at present, but just dreaming up ideas to try when he gets home.

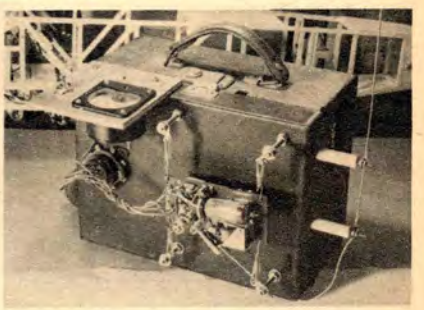
General News. A few notes from the bayou country come from George Trammell, Gulfport, Miss. Says he has completed a 38″ scale Cub Coupe (from old Capitol kit) which weighs 21 oz. Has Spit .045 engine with 7/4 plastic prop, and RK61 receiver. Proportional control—actuator is ½″ square, weights ¼ oz., and has a magnet 5/16″ dia. x 3/32″ thick! Plane handles perfectly and has flown nearly out of sight vertically. Earl Hamilton flying RC-Master with new fuselage, and 1 ft. added to center of wing; uses Cub .14 with 9/4 prop, proportional control. Sgt. Jerry Stebbins has a home-brew ship flying, after nearly a year of effort; 54″ span with twin rudders, E.D. .15 engine, one of George's midget twin-tube receivers. Jerry also uses proportional (guess George won't allow them to use anything else down there!).

By England's H. G. Hundleby; spans 4 feet. Allbon Javeline diesel inverted. Nose, main gear pivots at rear, sprung by rubber bands. Beautiful flyer in all types of weather until faulty receiver proved her doom. Similar to his earlier "Sparky", but longer moment arm.

Any R/C activity near Fort Bragg, Calif.? Melvin Farrer, Box 75, is just getting into the game, would like some company.

The phone rang during breakfast recently, and we answered. It was Russ Mills (W1MIQ) in So. Norwalk, Conn., who said he had a fellow who wanted to ask us some R/C questions. Next voice heard was that of Major Dave Melvin, who was talking via ham radio from Cherbourg, France! Dave said he flew R/C over there, had had good results from a Robot, which he had recently almost cracked up on his own house. He expects to be home in North Carolina soon. Conversation went out from Russ' station on the 20 meter ham band, and the chat was a most interesting experience.

Tony Grish (the Tornado prop man) has purchased 10 acres of land near his farm, will keep it in shape for model flying of all sorts. Will have several U/C circles, most of rest will be high grass for the F/F and R/C boys; a landing and ROG strip will be kept close-clipped. As you may have seen from his ads, Tony is an R/C convert. All modelers in area are welcomed at his "model port."



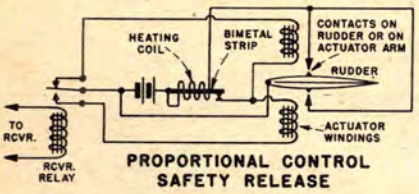
Also G. B. stuff: Ted Sills receiver test unit. Has batteries for high and low voltage supply, plus grid bias. Pot in H/T lead for relay adjustment, built-in milliameter. Receiver attached as shown, aerial lead clips on. Variable voltage connections à la portable radio.

Clubs & Contests. R/C Event at National Capitol Meet near Washington turned out very sadly, in spite of really hard preliminary work by members of DC/RC Club. Day was windy, cold, with a mist most of the time. Real trouble, however, was serious interference. R/C directors had checked list of frequencies used at field to make sure none were too near R/C bands. None were. When flying started (at about 6 a.m.!), it soon became evident that there were heavy signals on both 27¼ and 50 mc. Practically every ship that went up came down very quickly in a signal-on spin. Monitor receiver at R/C site indicated steady carriers on R/C frequencies, so a search was started to find the cause.

Walt Good and the writer spent the rest of the day on the trail of these signals, using the little direction finder described in the August issue; this unit proved its worth, but by the time we had discovered the culprits—and the reason for the terrific signals at the R/C site—it was too

late in the day to do much about it. Seems most of the interference was coming from the low-powered exciter stages of the A.F. teletype transmitters at the field. There were four of these transmitters on at all times, pouring out many kilowatts of power from beam antennas a half mile or less away, the beams pointed *directly across the R/C site.*

The output frequencies were around 9-12 mc., and though they were shifted around in this range as much as possible, there was always a strong signal on or very near 27¼. If there had been time, the remedies would have been quite simple: 1. Change the location of the R/C



PROPORTIONAL CONTROL SAFETY RELEASE

event to get farther away from the teletype network antennas. 2. Move out of the direct beam line. There was also thought to be interference on 465 mc., possibly from the GCA setup. So R/C directors—especially of meets held at or near Service fields—should make it a point to check beam directions, possibility of harmonic and exciter interference. Probably several days of monitoring on *all* the R/C frequencies would be a must.

Directors of this meet had several novel ideas that could well be copied by others: There were two flight lines, one for Repeat flights, one for First flights. Latter would have been big help to modelers who flew in other events at meet, arrived late at the R/C event. A repair truck was provided, with soldering iron always ready, and a stock of needed repair parts.

Winners were: 1. Jim Martin (DC/RC), Rudderbug, 27 mc. with 2-tube receiver (Jim made a beautiful flight, and had little interference—no one could figure why, including Jim!). 2. J. Campbell (Baltimore), 'Bug on 27 mc., and a tricky escapement set-up that gave rudder and motor control. 3. Scattergood (DC/RC), RC-Master on 27 mc., Good A.F. tone system.

There will be a Flying Boat Contest last week of September, sponsored by the Screamin' Demons of Long Island. Final date not settled as this was written, but there will be events for ROW free flight, PAA-Load and R/C—all for seaplanes or flying boats, remember. Info may be had from Bill Effinger, c/o Berkeley Models.

Claude McCullough sent results of Cedar Rapids Meet R/C event; weather was perfect. Winners: 1. Tie by Ralph Persson (Topeka, Kan.) with Aerotrol equipped Livewire, and Bob Andrus (Des Moines), original design plane, 3-tube rec., A.T. 3A4 screen grid transmitter, pulse control. 2. Ray Dersham (Des Moines), Rudderbug, E.C.C. hard tuber with pulse. 3. Merrill McCoy (Des Moines). Mac and his cohort, Jack Williams, just spectated.

The Dayton-Fairborn-Springfield area is very active in R/C, according to Jack Port. Springfield Strato-Hawks are the most radio minded, with about three-fourths of the members afflicted. They have beautiful airport to fly from. Another active group is centered at Xenia—all R/C so far. Info on R/C in the vicinity may be had from Jack at 331 N. Elm St., Fairborn. He's new National R/C Champ!

News of the Aero Watts club, San Jose, Calif., comes from the publicity man, Hayden Gildersleeve (Box 1038, Centerville). He notes that the club is rather new in the Bay area, as compared to those old-timers the Mustangs. They have an R/C trainer designed and built by club members, which will be used to promote R/C in the San Jose area. Plane has 6 ft. span, is powered by 2-speed Torp, and has a receiver similar to Good Bros. design. Club boasts over 15 members, many of them students at San Jose State College. Meetings are held every other Monday at a dancehall just outside San Jose. The members hope to stage an R/C meet soon, have held R/C Picnic to get familiar with contest rules and flight patterns.

Technical Notes. P.F.C. Joseph Lazzeri (Montford Point, Camp Lejeune, N. C.) has built the Mac II transmitter, and added a switch to cut out one tube, which conserves both A and B power. He just uses a two ohm resistor in series with the filament of each tube—the switch opens one filament lead. He finds the power is plenty for most uses with only one tube in use; extra power of two tubes can be employed if plane gets out of range. Joe has another good trick; he uses the same meter for both transmitter and receiver. Meter normally is carried in a closed circuit jack on the transmitter (the meter is fitted with a phone plug fastened to its terminals), and can be removed at any time and plugged into jack on plane. He uses a 5 ma. meter, and the transmitter jack has a shunt resistor connected across it to raise the full scale reading to 50 ma.

Some users of gas tubes have complained of the rather short life, but not many have heard of—or used—the system whereby the transmitter carrier is on steadily, and the key breaks this signal, to operate the plane escapement. Several flyers have used this system, which has other advantages, too; for one, the drain on the receiver B battery is much less, and interfering signals are generally not so troublesome. You do, of course, use more power at the transmitter, but larger batteries may be utilized here. Tests made by Raytheon on their RK61 tubes showed that the life of the tubes could be extended from two to two-and-a-half times, when the "on-signal" method of operation was used. It's as simple as that!

R. L. Brown (Ontario, Calif.) had receiver troubles that were cured by a simple trick. Seems his E.C.C. worked after a fashion, but did not give sufficient current drop with signal, near the transmitter; at 100 ft. or more there was no drop at all. After the usual checks and substitutions had been tried. R.L. was about to give up the whole thing. However, Charlie Bethard suggested addition of a more positive "ground" to the plane; a strip of aluminum foil was cemented under the entire length of the fuselage, and connected to B—. That did it! Perfect results were had from then on.

Another idea that may save someone grief: Bill Car- (*Continued on page 60*)

Sid Sutherland (left), winner of 1953 S.M.A.E. (England's AMA) radio control trophy at British Nats. Medium heavy power loading; uses Amco 3.5 cc power. Receiver is single hard tuber with circuit similar to E.C.C.; "valve" is a 3Q4 (H18). Looks like uncomplicated ship.

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With such an array of new R/C apparatus on the market, the novice in this field will welcome detailed descriptions. Air Trails will review various equipment, so that the prospective purchaser will know what will fit in his model, what batteries he must carry, current drains and the like. We will cover both finished equipment and kits, though there are few of the latter at the moment. Let us know if there is any other data on this new apparatus that you would like to see included.

Babcock R/C Receiver & Transmitter Specifications

Receiver #BCR-3. Overall size 4⅛" x 2⅛" x 2⅝" high. Weight with relay and tubes, 4.45 oz. Price $29.95.

Batteries: A-2 med. flash cells, 1.5V. at 370 ma. B—67½V.; idling current 1.2 ma., with signal on, 8 ma. C—15V., no current drain. Recommended battery complement weighs about 9.4 oz. (not including esc. battery).

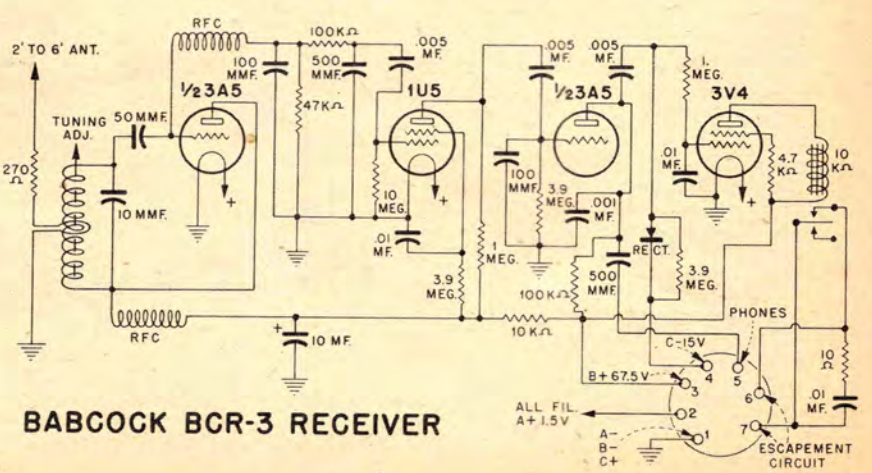
Adjustments required: tuning only. Antenna length not critical. No tuning meter needed—tuning done with headphones. Non-adjustable sealed relay.

Transmitter #BCT-2. Size 4¾" x 3½" x 8" high. Antenna projects 34". Weight with batteries, 5 lbs. Price $39.95.

Batteries: A—2 large flashlight cells, 1.5 V. at 300 ma. B—2 67½V. units; current drain with key up, or down about 16 ma.

Controls: On-off switch and key button on front of case. No meter required for tuning; radiation indicator shows when signal is going out. Single tuning adjustment reached through front panel.

General information. The Babcock R/C equipment was designed for reliability and ease of operation. By going to a bit more complex receiver circuit, the designers have produced a set that has no "sensitivity adjustment" and few tuning tricks. Makers are large-scale producers of radio equipment for target drones; their R/C outfit for the hobbyists is simplified version of drone ap-



BABCOCK BCR-3 RECEIVER

paratus. Workmanship and appearance are top grade. Both receiver and transmitter are in grey hammertone finish cases, that for transmitter being of steel for strength.

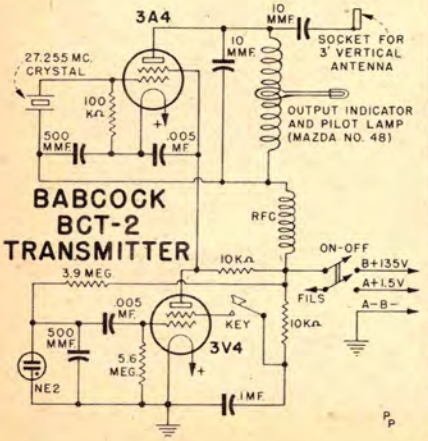
This equipment operates on a modulated signal, that is, the receiver will not operate unless it is receiving a signal with a superimposed audio tone. This has several advantages, not the least of which is that it makes the receiver much less susceptible to interfering signals from other 27 mc. transmitters. Receiver relay does not operate with straight unmodulated carrier, but only when the tone is sent out. Transmitter carrier is on all the time to minimize interference. Any failure at the transmitter, and most failures in the receiving end will leave the relay open; thus the system is termed "fail-safe".

The transmitter is entirely self-contained, with a 1/12 wave whip antenna which plugs in at top of the case. A lamp bulb on the front panel indicates power output, and is also used for tuning up, though once tuned for any particular crystal, retuning should never be required. Bulb goes on when power switch is turned to On position, and dims when key is depressed. Condition of batteries (and other parts of transmitter) is shown by brightness of bulb. Thus no meter is required for tuning or regular operation.

Transmitter circuit shows 3A4 tube is crystal-controlled oscillator, power output without modulation is about 2/5 W. Neon tube oscillator drives 3V4 modulator tube, which applies tone of about 900 cycles to screen grid of oscillator. Modulation percentage is about 85, and power output with key down about 1/10 W. This sounds low, but is ample, since tone systems normally require very little transmitter power, and receiver is very sensitive.

Transmitter batteries are all held by a single snap-on metal clamp, and are very easy to replace.

Receiver is actually a 4-tuber, since both halves of the 3A5 tube are utilized for different purposes. There is also a metallic rectifier between the last two tubes. Without signal, or with carrier only, last tube draws no plate current, due to use of C battery (this may be the tiniest 15 V. unit you can buy; no current is drawn from it). Transmitter carrier is normally on at all times, since this (*Continued on page* 58)



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AIR TYPE VARIABLE CONDENSERS, 15, 25, 50 mmf. any type, screw-driver shaft..... .45

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MINIATURE TUBE SOCKET, wafer type 10c molded ..... .15

SUBMINIATURE TUBE SOCKETS..... .15

FLEA-CLIPS 25 for..... .50

HEARING AID TYPE BYPASS CONDENSERS, all values ..... .15

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HIGHEST GRADE ½ watt carbon resistors, all values ..... .10

LINEN BASE BAKELITE BOARDS for all receivers, specify size with order..... .25

FLEAWEIGHT HOOKUP WIRE, 25 ft. of 5 assorted colors stranded, with plastic insul. .25

WE CARRY IN STOCK MOST ITEMS SPECIFIED IN NEW MAGAZINE WRITEUPS OF TRANSMITTERS, RECEIVERS, GADGETS, ETC.

SEND FOR FREE CATALOG, MONEY BACK GUARANTEE ON ALL ITEMS, SAVE COD fees, include postage, excess refunded. Minimum order $3.00. SPECIAL BONUS FREE with $10.00 order.

ELECTRONIC SPECIALTY SUPPLY CO., 58 Walker Street, New York 13, N. Y. **WAlker 5-8187**

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"EASY-TO-ASSEMBLE"

AUTHENTIC KITS

COMPLETELY PREFABRICATED

WITH METAL, PLASTIC AND DIE CUT PARTS

PIONEER TRAIL

BUILD ONE TODAY

No. 501 STAGE COACH

No. 504 CHUCK WAGON

No. 502 BUCKBOARD

No. 503 COVERED WAGON

$1.50 EACH

IDEAL MODELS

24-26 WEST 19th ST., NEW YORK 11, N. Y.

HOT SHOT *POWER PAC*

Quick, Dependable Starts

Here's a storage battery built like an automobile power unit — engineered just for model airplane starting. 4" x 6½" x 6½" high. Storage compartment big enough to hold 1 pint gas can, tools and extra props. Handy handle. Hard rubber case. 5 full plates.

Complete with Charger and Hydrometer. Only $6.95 F.O.B. Kenosha. Shipping Wt. 7 lbs. 2 Volt Capacity. 1 Amp for 30 Hours.

GREAT LAKES BATTERY CO.
Dept. 27, Kenosha, Wisconsin

SEND ☐ Hot Shot Power Pacs today to:

NAME.....

ADDRESS.....

RADIO CONTROL FANS! DON'T MISS THE BOAT!

Sterling boat kits are especially engineered and designed for radio control!

Complete installation shown in detail on easy, step-by-step plans!

See these spectacular models in our ad on page 67.

Sterling models

1530-34 N. Hancock St.
Philadelphia 22, Pa.

SCIENTIFIC BREAKS THE PRICE BARRIER

WITH THIS SUPER MODEL BARGAIN!

Rugged Directly-Joined Wing & Fuselage Construction

SCIENTIFIC

BRAND NEW!

WACO CABIN

A REALISTIC SEMI-SCALE VERSION OF THE WORLD-FAMOUS SPORT PLANE

BELIEVE IT OR NOT, YOU GET:

FOR ONLY $1.50

Carved Balsa Fuselage plus Formed Metal Cowling plus Formed Balsa Wings

featuring Jim Walker's **U-CONTROL** *for small bore engines*

Another New SCIENTIFIC BIG VALUE KIT

Imagine! THIS COMPLETELY CARVED BALSA FUSELAGE MODEL only $1.50

LITTLE MERCURY

The LITTLE MERCURY is jam-packed with extra-value features you'll find on models costing dollars more! It features Jim Walker's U-CONTROL for small bore engines (.039 to .074). A star performer — a really terrific buy!

FREE! Illustrated Catalog of Scientific airplane, race car and speed boat thrillers. Now available at your dealer or write direct.

SEE THESE SCIENTIFIC MODELS AT YOUR FAVORITE HOBBY SHOP

BE SPECIFIC SAY— SCIENTIFIC

Buy from your dealer and save 10¢ mail charge

SCIENTIFIC MODEL AIRPLANE CO.,

113 A10 Monroe St., Newark 5, N. J.

The Model Biz

Inside dope from the model industry; kits, engines & accessories

■ At press time we have several radio control announcements: A new source of R/C equipment has been formed—Gyro Electronics Co., 325 Canal St., NYC. Will specialize in radio kits and complete assemblies of transmitters, receivers, relays, tubes, escapements, dynamotors, vibrator power supplies and other R/C parts. . . . M. B. Spotts, wholesale model distributors of Philadelphia, now at new location: 3218 North 11th St., Phila. 40. . . . Irv Megeff of Electronic Specialty Supply Co. has purchased exclusive rights to this name. Outfit continues in business at the same old stand: 58 Walker St., NYC 13. Last month Irv's ad ran under the temporary business name of "Radio-tronic Specialties Company" but from now on he'll be ESSCO. . . . The Vernon C. Macnabb Co. has become the Citizen-Ship Radio Corp. Vernon says, "The same quality products, the same people, the same address." That's 990 E. Westfield Blvd., Indianapolis 20. . . . Ace Radio Control is located at Box 301, Higginsville, Mo. Has Ace escapement and dry battery charger. Ace Products of Pasadena, Cal., is a different outfit, longtime in the model biz, now manufacturing the 60c Ace Army Jeep and Ace civilian jeep kits. . . . M. S. Adams Co., Janesville, Wisc. (523 Lincoln St.), has R/C actuator, a positive, magnetic rudder control—$6.45. "Mac" will be telling you more of this in his R/C column.

Rcvr. & Trans.

(*Continued from page 57*)

makes the receiver even less affected by interference. Relay current goes from zero to about 6 ma., assuring reliable operation, and making possible use of sealed lightweight unit here. It is normally set to operate at about 3 ma. and release at about 1.5 ma., to give large margin of safety.

Receiver antenna coupling system is designed so that there is little or no hand-capacity effect, and any length from 2 ft. to 6 ft. may be used; since there is no tricky sensitivity adjustment, receiver may be expected to work in the plane just the same as it does on the shop bench. Tuning is done by connecting a pair of headphones to terminal 5 on the receiver power socket; with no signal you will hear a strong hiss. When transmitter is turned on, hiss disappears; pushing key button brings a loud audio tone. Tune-up simply means turning the screw on receiver to get tone as loud and clear as possible. This should be done at a distance of 100 ft. or more, as with any R/C equipment.

Receiver and transmitter come with all tubes, relay and crystal, also transmitting antenna. Receiver installation kit consisting of on-off switch, phone jack, battery connectors, wire, battery boxes, is available for $2.75. A complete instruction manual is also furnished; it contains both simplified and technical descriptions of the equipment, circuit diagrams, installation and operating data. There is also a circuit for "recharging" the receiver batteries from the power line, thereby greatly prolonging their life. The Babcock equipment is intended for use with escapements, but should work perfectly with pulse equipment, for those who prefer such operation; the relay is of SPDT type, though only one fixed contact is brought out to the power socket. The other fixed relay contact may be reached at the relay socket.

How to Use Fiberglas for F/F and R/C Models

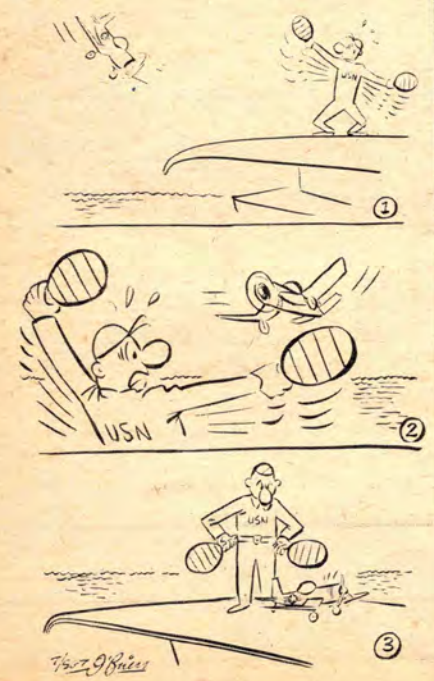
(*Continued from page 40*)

A very strong wing spar results if a hollow balsa section is wrapped diagonally with fabric and resin. The original wing was to use this type of spar at about one-third chord and a ribless laminated section forward to the leading edge. This construction had considerable strength but proved to be too heavy. The lamination for this section consisted of one thickness of 108 cloth, 1/32" balsa, and another thickness of 108, laminated over a wooden pattern. The wood was handled the same as if it were fabric. A compromise was reached by reducing the width of the lamination to about one-quarter and using it over standard wing construction in place of the usual sheeting. The original stabilizer was made in a similar manner but discarded after one test flight as it was too heavy.

Do not be alarmed to find the chem-setting resin hardening in the mixing jar although remaining tacky on the form. The curing reaction of the resin generates heat in appreciable quantities which is held better in the larger mass. The only instance in which the resin failed to cure properly was when it was applied over *partially dry* release agent.

After using both the sun-cure and chem-cure resins in these experiments, it is felt that the chem-cure type will be found most suitable for hobby use. As little as a half ounce of resin and the proper amount of catalyst may be mixed for use, and since this mixing is very simple it is better to run short than have any large amounts left over.

The following materials were purchased from Thalco, 765 So. Harvard Blvd., Los Angeles 5, Calif.: Boat Resin and proper catalyst (sun-cure type). Chem-Curing Boat Resin and catalyst. Garalease #915 (release agent). Boat Cloth (heavy glass fabric). Surfboard Cloth (medium weight fabric). #108 Glass Cloth (light weight fabric). Norez (soap for cleaning hands).



IF YOU LIKE STUNT OR SPORT FLYING . . .
YOU'LL LOVE THIS SENSATIONAL DELUXE MODEL!
A SPECTACULAR PERFORMER AT AN AMAZING, LOW PRICE **2.95**
Complete less engine
100% COMPLETE — 100% PREFABRICATED
Every part cut, formed, or shaped . . . satin-smooth finish

SCIENTIFIC
bel-air
18" WINGSPAN
FOR .039 TO .099 ENGINES

featuring Jim Walker's U-CONTROL

OTHER SCIENTIFIC VALUE-PACKED THRILLERS

CURTISS HAWK $2.95
SPAN: 17½" For .020 to .074 Eng.

½-PINT RACER $2.95
LENGTH: 9" For "½ A" Gas. Eng.

BOEING F4B-4 $2.95
SPAN: 17½" For .020 to .074 Eng.

BOEING P-26A $2.95
SPAN: 18" For .020 to .074 Eng.

LITTLE SABRE $1.95
SPAN: 18" For .020 to .074 Eng.

PIPER CUB $1.95
SPAN: 22" For .020 to .074 Eng.

BEECHCRAFT "17" $2.95
SPAN: 16" For .045 to .099 Eng.

SPORT RACER $1.50
SPAN: 18" For .020 to .074 Eng.

LITTLE MUSTANG $1.95
SPAN: 18" For .020 to .074 Eng.

LITTLE BIPE $1.50
SPAN: 16" For .020 to .074 Eng.

LITTLE DEVIL $1.50
SPAN: 18" For .020 to .074 Eng.

LITTLE ACE $1.95
SPAN: 18" For .049 to .099 Eng.

Buckeye Jr. Cabin $3.95
For "½ A" Eng., Electric Motors

DREAM BOAT $1.95
"½ A" Eng., CO_2, or Elec. Motors

BUCKEYE SR. $4.95
LENGTH: 17" For .099 to .29 Eng.

BUCKEYE JR. $3.95
LENGTH: 14" For .020 to .074 Eng.

RIVIERA $3.50
For "½ A" Eng., Electric Motors

SEA HAWK $2.50
"½ A" Eng., CO_2, or Elec. Motors

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YOU NEVER GO WRONG ON AN F&B MODEL . .

z-z-z-z-z here comes the

GREATEST EVER . . .

THE NEW

Stinger

NEW STUNTER IS FULL OF TRICKS

- - - you can do everything but fly IN IT YOURSELF ! !

$6.50

By mail add 25c

New slick design . . a complete unit and a TERRIFIC VALUE!!

It's coming your way—watch out for F&B's NEW STINGER . . . it's the newest thing with wings . . . it's a ringer . . . 48 inch wing span for Class B-C-D. A beaut of a flying ship . . . has rubber tired wheels, bell crank and control horns. Absolutely new, it's a V-tail Stunter that really stunts. Crisp, die cut, first quality balsa. Note its

- ALUMINUM LANDING GEAR
- FULLY COWLED ENGINE
- COMPLETE HARDWARE

Combat SKY BOX Class A & B Full Stunt **$2.95**

WARHAWK Class B-C **$5.95**

VIXEN Class ½A Full Stunt **$1.95**

VAMPIRE Class B-C Full Stunt **$4.50**

VIKING Class C-D Full Stunt **$5.75**

P-T TRAINER Class A-B **$1.99**

SHARPY Class C-D Stunt Plane **$4.95**

FOLLY ½A for all engines **$1.75**

F&B HINGES—invisible, everlasting, per set, 30c

Scale Model Car Kits—Nash, Jaguar & Chrysler

F&B MODEL AIRCRAFT—3240 LARIMER DENVER 5, COLO

CONTEST CALENDAR

List meets here! Advise Air Trails not less than 90 days in advance. If any area restrictions on entries, be sure to state. Address of contact man in same city as site of meet unless otherwise specified. (Give telephone No. of contact man when possible.) When info on events is furnished these are abbreviated as follows: indoor rubber powered—IR; outdoor rubber powered—OR; outdoor hand launched glider OHLG; indoor glider—IG; tow-line gliders—TL; free flight gas—FF; control line speed SP; control line scale—CLSC; control line stunt—ST; team racing—TR; combat—COM; radio control—RC; rise-off water free flight—ROW; carrier models—CAR; free flight scale—FFSC; non-flying exhibition scale—NFSC; jet speed—J; controline endurance—CLEND; Wakefield—WAK; PAA-Load—PAA.

CONN.—Wallingford, Sept. 13. State C/L Championships. C. A. Orrill, Jr., 47 Carpenter Ave., Meriden.

ORE.—McMinnville, Sept. 13. Portland Stardusters' 6th FF & RC meet. K. A. Thorstad, 6344 N.E. 8th Ave., Portland.

LONG ISLAND—Hicksville, Sept. 13. L.I. Gas Monkeys' 6th annual. Half-A FF, B-C combined FF, PAA, Jetex, P.T. Ferrara, 77-32—79th Pl., Glendale, L.I. EVergreen 2-6241.

N.J.—Perth Amboy, Sept. 13. PAMAC Model Flying Olympics. Robert Peru, Box 1248, RFD 4, Rahway.

OHIO—Akron, Sept. 20. A.S.M.P.E. meet. Miss Frances Alexander, 25 Mull Ave.

IOWA—Grimes, Sept. 20. Des Moines Modelaires club meet. C. R. Gould, 3840 38th St., Des Moines.

MASS.—Northampton, Sept. 20. Holyoke GMC 4th annual FF meet. Daniel Sobala, 288 Newton St., S. Hadley Falls.

LONG ISLAND—Bayville, Sept. 26. Screamin' Demons' Hydro Championships. Half-A ROW, A-B combined ROW, Half-A PAA-Load flying boat, A-B comb. PAA flying boat, R/C PAA flying boat (precision). Screamin' Demons, 601 Meadowbrook Rd., Uniondale.

N.J.—Millville, Sept. 27. Garden State Aeronauts meet. Andrew Canino, 116 Quince St., Vineland.

R.I.—Woonsocket, Sept. 27 (and Oct. 4). Flying Fools Fair. T. W. Wenclawik, 5 John St. OR; WAK; PAA; OHLG; NORDIC; FF; RC; ST; SP; COM; JET; TR; CLSC.

CALIF.—Los Angeles, Oct. 4. Thermal Thumbers FAI team meet. K. A. Aymar, 401 Lake Manor Rd., Canoga Park.

LONG ISLAND—Hicksville, Oct. 4. Screamin' Demons 7th annual (Part 2). Bob Buragas, 255 Laurel Ave., Arlington, N. J.

(See also contest mentions in Dope Can, R/C, Southern Scene, and Western Roundup columns.)

R/C News

(*Continued from page 55*)

roway found that the crystal in his transmitter was not working so well. He was ready to purchase a new one when Brownie suggested that he scrape the pins first. Bill did, and the rock worked perfectly after that! Bob notes that Convair Recreation Assoc. has formed a model club, and any flyers in the San Gabriel Valley and sur-

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LARGEST AND MOST COMPLETE HOBBY SUPPLIERS

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MODEL CRAFT HOBBIES LTD.
66 WELLINGTON ST., WEST
TORONTO, ONTARIO, CANADA

rounding area are welcomed. All types of models are flown, including quite a few R/C jobs. They have a good flying field and meeting place; data may be had from Bob at 748 E. 4th St.

Bill Nesbitt (1115 Chickasaw Dr., Silver Spring, Md.) sent us an interesting list of Willard Non-Spill storage batteries in small sizes, which was compiled by DC/RC members Bill Saks and Ed Smull. It includes 28 of these little units in many voltages and amp-hr capacities. Interested readers might be able to procure copies from Bill (be sure to enclose a stamped and addressed envelope).

Commercial News. A new E.C.C. hand-held transmitter, No. 1061, is now available from American Telasco Ltd. (Huntington, N. Y.). Uses single 3A5 tube, is crystal-controlled on 27¼ mc., and can run at 4.8W. input. Case is 10" high, 6½" wide, 2¼" deep, and antenna is 4 ft. long. Price is $27.95 with crystal, tube and ant., less batts.

R/C experimenters will be interested in free catalog of Burstein-Applebee Co. (1012 McGee St., Kansas City, Mo.). Lists usual line of radio apparatus and parts, also many bargains that are of use to R/Cers. For example, No. 19B764 telescopic antenna, extends from 9½" closed to 5 ft. open, costs $2.49. Also, their relay No. 17A995, a super-sensitive job that will work on a fraction of a milliampere. It's too heavy for most plane work (5½ oz.) but would be fine for boats, pulsers, etc. Coil is 4000 ohms and adjustments are by screws; price is $1.95.

Ever get stuck out at the flying field with a vital soldered connection broken, and no way to fix it without going home? There is a good solution, a tiny 12 watt soldering iron that works on 6 V., from either a transformer or battery. Sold by American Mercantile Co. (33 W. 42nd St., N.Y.C. 36) for $4.00, the iron is called the Oryx, and is tiny enough to go in the smallest tool boxes—about 6" long and 5/16" dia. It will handle practically any radio or electrical job you have in a model plane or boat, and can be had with various shapes and sizes of tips, which are easily replaceable.

Ace Radio Control (Box 301, Higginsville, Mo.) is a new concern catering solely to the needs of R/C builders. They carry many small parts at reasonable prices, kits for equipment that is described in model mags, and will shortly introduce their own line of transmitters, receivers, and control units. Write for free catalog.

Many users of the little toy plastic electric motors to be had at hobby stores have experienced trouble due to short brush life, inefficiency, etc. New motor introduced by Wilson's of Cleveland (425 Lakeside Ave., Cleveland 13, Ohio) and selling for $2.50, is one of the best of this type we have tried. It has long-lasting silver-graphite brushes, and is wound for 3-6 V. Running without load on 4½ V., the current drain is only 150 ma.; stalled current on same voltage is about 1 A., and motor appears to have good power and efficiency.

Another source of Alnico disc magnets with center hole has been unearthed. Write to Magneto Sales Co. of New York (261 W. 54th St., N.Y.C. 19). They have many sizes of discs, ground all over; for example, 1 3/16" dia. x ¼" thick with 3/16" hole for $1.25. Also, 1" x 3/16", with 1/8" hole, for $1.00. Several smaller sizes in stock.

Low-priced ready-made proportional actuator finally available. Sells for $2.95 from Control Research (Box 9, Hampton, Va.) Unit is 7/8" dia. x 1" high, has threaded mounting lugs. Gives good pull on 3 V., at about 250 ma., and really yanks on 6 V. It is a rotary solenoid, must be used with return spring for proportional. Also good for stepping switches, etc.; weight is 1½ oz. C.R. announces price reduction to $12.95, for complete kit of parts (meter included) to make Field Strength meter shown in Sept. "A.T."

—HOWARD MCENTEE

FLASH!

Joe Foster Wins Wakefield for U. S.!
Dave Kneeland Wins FAI Gas for U. S.!
Bill Fletcher and Carl Wheeley will bring you the details—watch A. T.!

AT LAST! WORLD'S LARGEST MAKER OF R/C EQUIPMENT FOR ARMY-NAVY TARGET DRONES

brings you TRUE PROFESSIONAL STANDARD

Radio Control

Wt. 5 oz.

EXCLUSIVE FEATURES: Receiver Model BCR-3 Ultimate in fail-safe design. • 3 hard tubes, each doing its own job. • Constant carrier with audio tone. • Greatest relay current change—0 to 6 Ma thru 10,000 ohm relay. Signal increases Relay Current. • Greatest sensitivity—5 microvolts for reliable operation. • Hermetically sealed relay—no dust in contacts, no adjustments ever. • As easy to handle as your broadcast receiver: no tuning tricks, no hand capacity, no overloading, non-critical antenna, tunes up with a pair of headphones. • Our own design of components, not available to other R/C manufacturers. • By far the most rugged equipment available. • Self contained arc supression. • No tube selection required, any good tube works in any position. • Reliable performance thru a wide range of battery voltage and conditions. • May be used with any escapement.

DICK SCHUMACHER Dean of Radio Control Modelers says: "Most reliable, easiest to handle radio control ever — and I've tried them all!"

Transmitter Model BCT-2
Crystal controlled on 27.255 megacycles. No license required.
Contains separate modulator tube and audio oscillator.
Uses short loaded 3 foot whip—no need for long unhandy antenna.
Range is more than adequate for any radio controlled flying.
Has radiation indicator on panel, simply tune for maximum output.

Order Direct From Factory Today

Competitive prices
BCR-3 Receiver Complete with tubes and relay and connector $29.95
BCT-2 Transmitter Complete including crystal, tubes, antenna (less batteries) $39.95
BCR-3 Installation Kit ..... $ 2.95

Terms: Cash with order or ⅓ with order, balance C.O.D.
Note: On prepaid orders, factory pays freight.

YOU DON'T HAVE TO BE A RADIO ENGINEER TO USE THIS EQUIPMENT

Write for free literature giving full details.

BABCOCK RADIO ENGINEERING, INC. 7942 Woodley Ave., Van Nuys, California

Dealer inquiries invited.

15 Fifteen Famous Fighters 15

SOLID SCALE MODEL KITS

Every little detail visible in the actual airplane, every single item that can be reproduced is given to you.

Jam-packed with metal castings (47 in the P-38 Lightning), these kits are the choice of the best model builders everywhere. See them at your dealers — and, although there is no real comparison, *compare them* with any other kit available.

FW-190 Focke-Wulf $2.75

P-40 Warhawk	$2.75	F6F Hellcat	$2.75	P-38 Lightning	$3.50
F4U Corsair	2.75	F8F Bearcat	2.75	British Spitfire	2.75
P-51 Mustang	2.75	P-47 Thunderbolt	2.95	ME-109 Messerschmitt	2.75

JET MODELS

F-86 Sabrejet	$2.75	F-84 Thunderjet	$2.75
F-80 Shooting Star	2.75	MIG-15	2.75
F9F Panther	2.75		

Ask your dealer for "Dyna-Mo." If he cannot supply you write us direct, enclosing check or money order plus 25¢ for packing and postage—no C. O. D.'s.

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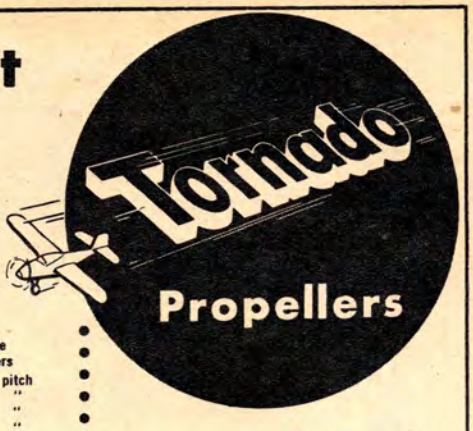

Radio Control Propeller
(recommendations)

Engines	First Flights and Low Altitude	High Altitude and Maneuvers
All .049's.....	7 in. dia. 2 in. pitch	7 in. dia. 3 in. pitch
Cub .074.....	8 " " 3 " "	8 " " 3 " "
.09's.....	10 " " 2 " "	9 " " 3 " "
.14's and .15's...	10 " " 3 " "	10 " " 4 " "
McCoy .19.....	11 " " 3 " "	10 " " 4 " "
Cameron .19.....	11 " " 3 " "	11 " " 4 " "
K&B .19.....	12 " " 3 " "	11 " " 4 " "
Fox .19.....	12 " " 3 " "	11 " " 4 " "
K&B .29.....	12 " " 3 " "	12 " " 4 " "
Fox .29.....	12 " " 3 " "	12 " " 4 " "
McCoy .29.....	12 " " 3 " "	12 " " 4 " "

R. C. Propellers
10 in. dia. 2-3-4 in. pitch—35c ea.
11 and 12 in. dia. 3-4-5-6 in. pitch—45c ea.

Plasticote Propellers
5" and 6 in. dia.—15c ea. **7 in. dia.—20c ea.**
8 and 9 in. dia.—25c ea. **10 in. dia.—30c ea.**

For the STUNT FLYER
The new 10" dia. Plasticote Propellers are now available at 30c ea. in 5 and 6 in. pitch. On all the .29's use a 10-5, on the .32 and .35 a 10-6. Forster 29 and 31, McCoy 29, do very well on the 10-5. The efficiency of the Plasticote propellers run up to 95%, and it may be advantageous to try a 10-5 instead of a 10-6.

RADIO CONTROL NOTES
When flying R. C. it is necessary to reduce venturi opening from 25 to 50% on almost all engines. Large props slow your engine R.P.M., reducing suction. The model does not fly level at all times . . . dives and stalls are encountered changing the fuel force. Plug the venturi opening to such an extent that you get the power you want from your engine. Too much speed in R.C. can be disastrous.

GRISH BROS.
St. John 1, Indiana

Barracuda

with speed proved 3 point suspension

The Barracuda is a prefabricated, all balsa, speed boat that can be assembled and fitted with either electric or ½A gasoline motor in one hour. Complete hardware consisting of mounting screws, threaded propeller shaft, brass stuffing box, special 2 bladed propeller and rubber universal are also included. The component parts are finished so finely that painting can be done without sanding. Explosion type, easy-to-read, pictorial plans are supplied with each kit. This 14" long beauty will give many thrilling hours of speedy performance.

$2.50

2 new speed kings by MASTER MODELCRAFT

RYAN-ST

with die-stamped metal cowl

Master Modelcraft's speedy new ½A replica of the famous Ryan-ST completely prefabricated with fully shaped fuselage and wing, die cut balsa parts preformed wire landing gear, complete hardware, and for the first time in low cost kits, a die stamped and punched finished metal cowl.

The graceful wing spans 17½". Here is the epitome of prefabricated, beautifully scaled, model design, suitable for team racing or general sport flying. The finished model is beautiful enough to grace your mantlepiece as an airplane of a by-gone open cockpit era.

$2.50

SKYLARK
Sensational half-A free flight. 31" span. **$2.00**

PRIMER
Realistic profile for stunt, sport. 18" span. **$1.40**

FLIP-FLAP
Revolutionary full stunt job. 24" span. **$3.50**

WING-DINGUS
Experts' choice for stunt, sport. 16" span. **$2.25**

add 25c per kit by mail

MASTER MODELCRAFT
727 Westchester Ave.
New York 55, N. Y.

WING DING
Tops for half-A contest flying. 18" span. **$2.25**

HOWARD "IKE"
Howard's famous "Ike" scale racer. 20" span. **$3.00**

SMALL FRY
Goodyear prototype for half-A team racing. 17½" span. **$2.50**

BRITISH SE-5
Super prefab half-A scale. 17" span. **$2.50**

Western

(*Continued from page* 36)

for two in Wakefield, likewise. Hal had a second model, but he splattered it in a hurried attempt.

There were a lot of possibilities during the contest. Dick Baxter, who finished second, turned in 3:56 on his last flight, his poorest of the contest, and was the only man besides Hal Roth who was ahead of Joe. In F.A.I. gas George Cassellberry flopped and wound around for 1:39 on his last flight and was the only man besides Hank Cole who could have beaten Stan. For an amazing coincidence, both winners were in third place after two flights and both turned in 5-minute flights in their last attempt. Just what we need, very fast finishers. We like this team, this year, and feel we will be way up on top.

As a closing note on the contest, Pop says only one issue was unsettled when the contest ended, that of wisecracking champion. Whether it was Harvey Milts who "packed his bags a year too soon," or Dick "Little Wheel" Letaw . . . he wonders what those two will think up next.

Way down Los Angeles way, under the expert guidance of Bob Moncrieff, the two-day Pacific Coast Model Aircraft Championship was a gala affair. On Saturday during the glider and rubber events no less than seven records were applied for. Don Tune turned in 5:51 for senior hand-launch glider, Dennis Schaur 4:30 for junior, and Dick Everett 11:24:5 for open. In the new limited rubber event—Merrill Combs, newly arrived from up north, did 16:32 for open, Don Tune 6:05 for senior, and Ronald Gallman took junior. In Nordic Ed Slobod did 10:39 in open.

There were some really outstanding models flying that day. Lo Salisbury has a return gear rubber job that practically climbs out of sight, a 2½ ounce model and 3 ounces of rubber on a 17 inch diameter, 26 inch pitch prop. Lo didn't seem to have any

(*Continued on page* 64)

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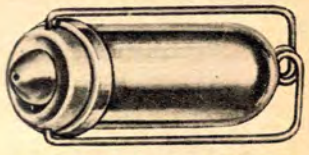

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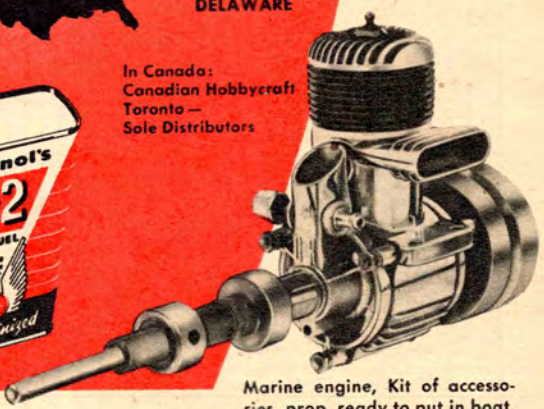

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4. Model must be built by contestant from Top Flite Jigtime kit. No other parts may be used except to repair damage. However, propeller and rubber band may be any size, and do not need to be from kit. Sanding and doping permitted if contestant desires.
5. Official flights may be made at meets organized by contest directors or leader members of the Academy of Model Aeronautics, hobby store dealers, scout leaders, Y.M.C.A. or church youth leaders, teachers, club leaders, or similarly qualified persons.
6. Certificates of official flight shall be forwarded to Top Flite Models, Inc. Best flights postmarked no later than Sept. 30, 1953 shall be adjudged the winners, and shall receive the prizes listed.

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(*Continued from page 62*)

trouble with this large prop. Jack Block and Don Tune flew pusher canards but seemed to have adjusting trouble which they later bugged out. Merrill Combs, flying a ship of Wally Summers' design, a Gollywock or Jabberwock or a Wockywock, sure put them upstairs.

Ed Slobod pulled the best one. He walked out on the field and asked, "Where's Towline?" One helpful person pointed out a towline. He then asked if he could take a flight, the guy said yes. Ed towed up and went out of sight. Upon returning to the field he found no time listed for him. An hour later it was figured this way: yes, the guy said Ed could use his towline to take a flight, but he wasn't an official.

The following day gas flying was in full swing by the time we arrived on the field. Sal Taibi already had his flights in with his A Spacer and had totaled 16:26. Lots of fellows in maximum flights of six minutes. Ray Van DeWalker had 15:54 in B with his ancient payload ship, Jimmy Devitt had two ships up in thermals at one time. Incidentally, that new Sailplane wing and tailed ship sure goes upstairs with that Torp .32. Missing from the ranks of flyers were Pat Regan, Paul Gillian, Bob Holland, Bob Wiehle and countless others; all but Pat were timing and we later found that he was flying R/C.

The winners in the various events all had plenty of competition, which left every event undecided until the contest was over. Many a contestant sweated out the numerous lost ships which were down in the alfalfa fields, where it was proved beyond doubt that models can hide better than any other place. We were searching for our own model when one landed not more than fifty yards from us, and we still haven't found it (either model).

After the smoke had cleared, Barry Robertson was in first in Half-A Junior (due to the 18-year division of ages), F. L. Swaney won open. In Class A Harvey Woien was first in junior, Sal Taibi in open class; B combined, Roy Van De Walker, Class C, "Slick Ship" Toshi Matsuda. Radio Control

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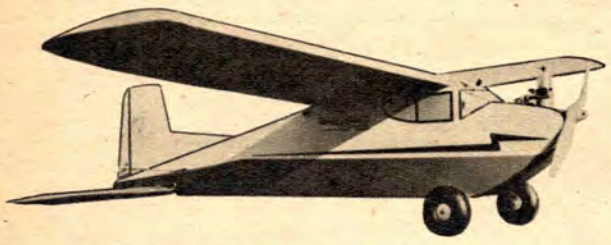

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was won by Howard Bonner, J. Curry 2nd, and ex free flighter Pat Regara 5th.

The club championship, something new this year, found eleven clubs fighting for the John Bollinger Memorial Award. At the end of the first day, the San Valleers were well ahead of the pack with their strong point, gas, coming up the next day. They were considered a shoo-in by a lot of fellows but guess what happened—only two guys showed up with models the next day. Even if they had turned out in force, they would have had quite a chore beating off those Long Beach Thunderbugs who were in their glory that day and won going away.

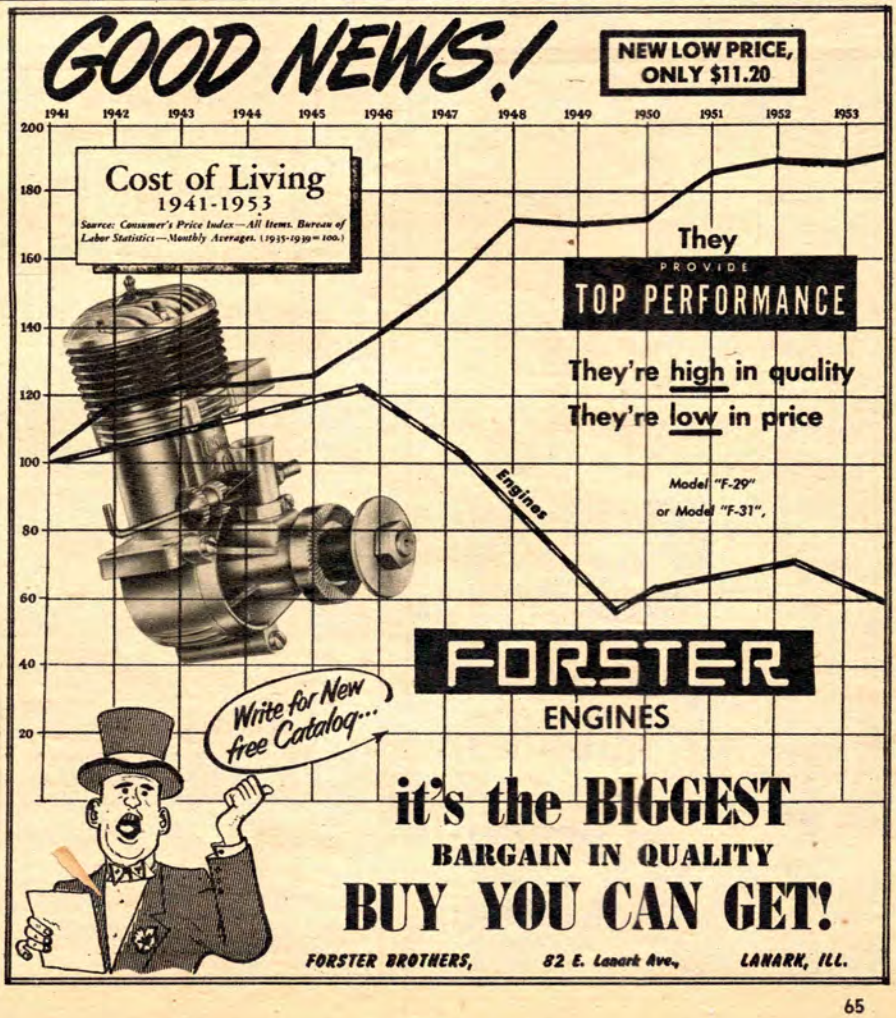
The WAM continued to amaze us with their very big contests. A recent meet at Salinas had over 250 entries—how do they manage to put so many contestants through their paces in a day, once every month? Those guys have a wonderful organization. Vic Garner, that hot pilot with those very fast ships, continues his winning ways. His C job did 140.40 for a new WAM record—which is well above the National record. He also won B Proto, C-D Proto and was 2nd in A Proto—quite a lot of flying for one day. Guess who won the High Point Trophy—yep—Vic!

The Robbers' Challenge Trophy for three-man stunt teams proved to be very hotly contested, with the Newark Model Busters nosing out the Dos Palos Rod Busters by four points. Wot happened—did they bust a rod?

We note by the results that Bob Palmer journeyed all the way up thar to compete and won no less than two firsts—B expert and C expert. Rudi Aron pushed Bob to the limit in B and had by far the best looking ship at the contest.

We couldn't help but note a winner in Class A speed at one of the WAM recent contests, that of Joe "National Champ" Foster with 121 plus. To further spike some vicious rumors which have continued to fly since the Nats, Pop has offered some information for you disbelievers, that Joe got his start in model contests as a speed boy some years ago. He was sidetracked

(*Continued on page 67*)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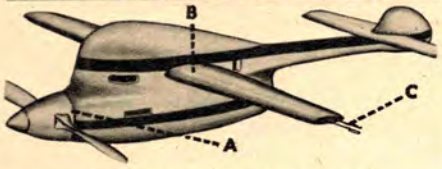

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FOREIGN News-Notes

■ In Europe, where towline design has been carried to a high degree of refinement, a model publication recently passed along this handy recommendation regarding the very important locations of the tow hooks. The center of gravity is located on a side profile of the fuselage and from a longitudinal reference line

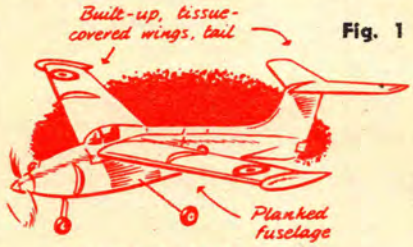

Fig. 1

"QUICKSILVER"

drawn through this point, two angles are struck downward through the lower fuselage line. The lesser angle, 65 degrees, locates the front tow hook (windy weather) while the greater angle, 80 degrees, locates the rear tow hook (calm weather). Offset tow hooks are seldom used in Europe, the mechanical auto-rudders being preferred.

But tow hook location alone does not

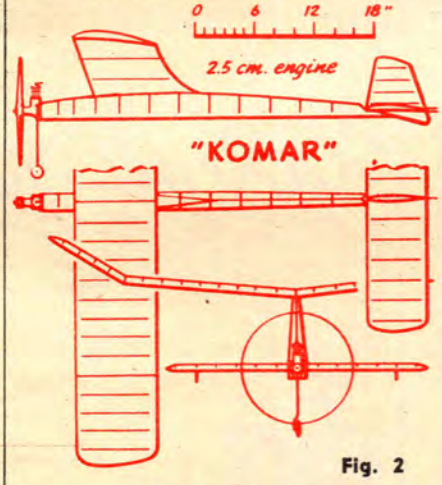

Fig. 2

determine stability on the towline. P. L. Roe, Derby, England, sums it up after extensive testing this way: Too much "correcting factor" causes the side-to-side weaving which tends to become aggravated; too little causes sideslipping. To *increase* this correcting factor, move tow hook forward, move C. G. back, increase fin area, or reduce dihedral. To *reduce* correcting factors, reverse these procedures.

Fig. 3

JOUKOWSKI

L.E.	% Chord	0	25	5	10	20	30	40	50	60	70	80	90	100	T.E.
	Upper	3.25	6.5	8.0	9.9	11.9	12.4	12.4	11.4	10.0	7.9	5.5	2.3	0	
	Lower	3.25	1.37	.87	.12	.37	1.2	1.7	2.4	2.6	2.7	2.5	1.5	0	

BENEDEK #6356

L.E.	% Chord	.25	.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	T.E.
	Upper	3.14	4.55	6.55	9.55	9.15	8.96	8.25	7.10	5.75	4.08	2.25	.22	
	Lower	.70	.15	.42	1.12	2.45	3.25	3.57	3.65	3.50	3.00	2.22	1.19	0

Why is it that we find all manner of originality in control-line models but very few departures from the ordinary in free flight? For ten years the sport control jobs have enjoyed a great following yet few modelers build free-flighters purely for pleasure flying. Typical of what *can* be done is Britisher E. Fearnley's nifty little "Quicksilver." Employing modern swept lines, this four-footer uses a Half-A-size diesel. Not restricted to scale proportions, it is designed for flyability yet details such as canopy, airflow fences, tip tanks, and a striking color job contribute greatly to realism in flight. (Fig. 1)

The new F. A. I. "International" gas model classification may require a season of introductory familiarization before it gains the popularity in this country it is

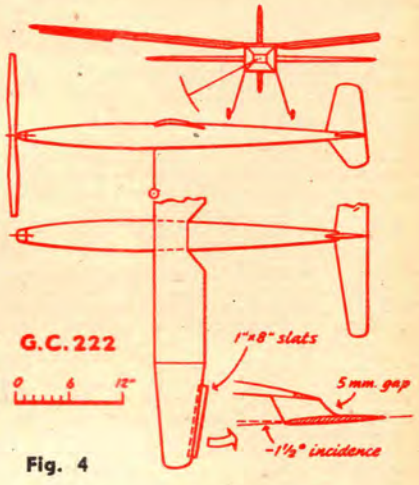

Fig. 4

certain ultimately to receive. It should prove a popular class, a meeting ground between advocates of small craft (low cost, quick construction, easy handling and transporting) and those favoring the larger ships (more power and penetration, greater requirement in structural design and workmanship). This should be the dish for U. S. modelers; we've hot engines such as the new Cubs and Torps with more to come, and more than a decade of intensive contest flying background in the gas model category. Most foreign engines in this international class

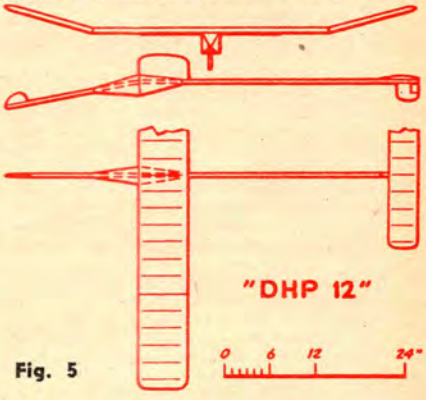

Fig. 5

are diesels; these are English, French, Dutch, German, Norwegian, Australian. Italy produces a fine glow engine, the Super Tigre. However, after testing all available engines in upper limits of international class (under .15 cu. in.), British magazine Model Aircraft declared the U. S. Cub .14 to have highest power to weight ratio of any engine checked.

"Komar" is an example of high level design found currently in Europe. Built in Czechoslovakia, it reflects careful planning and employs (*Continued on page 77*)

(Continued from page 65)

into F/F by the Cloudbusters and only last year built some new special jobs just for the Nats. Although he was assisted to the Championship by two Texans, he built those ships, they were speed jobs, too, not stunt models, flying for points.

At Modesto, that WAM gang had another huge meet. Going down the list of winners, one finds the "Hells Angels of Napa" club all over the place. That club is determined to be tops in speed this year and at the present time they have twice as many points as the runner-up club, Aero Modelers of Alameda. Guys like Karl Caldwell who is a consistent AB winner, Stan and Ed McGowen—you can't stop them; if one guy has hard luck, someone else is on. A lot of fast flying by this club.

We can't help but wonder just what kind of flying scale models these guys have, for we notice John Tatone and his Tipsy Jr. in 3rd place following Melvin Schmidt in 2nd and Virginia and Ray Randall in 1st! There was a point spread of 3½ points between these places—would you say this event was hotly contested?

One gal is dominating the fair sex's flying, Joan Calkins of the Peninsula Prop Twisters. Don't know what she's doing with all the trophies; she must have plenty of them.

Pop Robbers reports that Curley Delta of the Banner committee worked hard and long and came up with 26 inch by 15½ foot banner with the words "Model Plane Meet" on both sides. At the first contest he thought the "International" training really took, for his huge thing disappeared. Only this time it already belonged to us, he wanted it back. It came back. Let it alone this time, fellows.

We were driving around Ontario last week when we heard some engines really tuning up. Quite naturally we followed the sound and came across a miniature race car meet. We introduced ourselves and in turn met quite a few guys. Our ears pricked up when Dick McCoy and Woody Woodward were mentioned by name. Dick certainly needs no introduction, but to you newcomers to the ranks, Woody is the guy

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Chris-Craft 32' Cruiser	B-6M	9.95
Chris-Craft 50' Catalina	B-7M	11.95
Century Sea Maid'20'	B-8M	7.95

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who worked the engines that made the team of Allen, Kitchens and Woodward such an unbeatable combination.

One hears talk of the first guy to do 150, the first guy to do 160, etc., but we can remember a tour this team made, including the Nats, and to the best of our knowledge they won either seven or eight straight contests, a record which has no parallel. Woody is still quite active, we found. His main interest is in race cars where he has made quite a name for himself. His shop is an engine rebuilder's paradise. Everything or anything is available—if he doesn't have it, he'll make it. When Dooling pistons were scarcer than hens' teeth, he had some sand-cast, slightly redesigned of course, and machined his own. When the Hornet magnetoes became in short supply and Hornet quit making them, he took a trip to the factory and now has Hornet's entire line on consignment. He puts parts together for friends or when he feels like working, which is quite often.

We had wondered how the John Galvin Park in Ontario came up with those two U-control circles and that race car track. Well—we found out this man had a lot to do with it. The present task he has set up for himself, along with keeping this race car track going, is to get the U-control circles fenced in with a heavy storm fence. Woody is very safety conscious and he wants that fence up before he runs any more contests. One thing about him which we think stands out above all is that if any kid comes around and wants help, he stops what he is doing and helps him, fixes the engines, puts on the right prop, even mixes fuel. But above all, he wants that fence so the model flyers and spectators will be thoroughly protected. Then look out—big U-control contests in Ontario again. Best of luck to you, Woody!

—DICK EVERETT

Southern Scene

(*Continued from page 37*)

did a job that would make the Nationals and Internationals green with envy. Davis supervised speed and jet, Ernie Knickle handled free flight, Connie Caviness and Fred Turner processed free flight planes right at the area. Ernie Gibert, assisted by Forest Cole and Jim Wade, made a big success of the radio control and radio race events.

Ed Stone of Jacksonville, Fla., won the first radio control race in model aviation history and gathered in his arms the princely perpetual given by genial Jim Walker. Andy Peterson, formerly from the West Coast worked with Knickle on free flight, and his experience was much in evidence. Carl Friend, who judged scale in the '51 Nats, worked with Don Williamson judging flying scale. One flyer was heard to remark, "These are the first scale judges I ever saw who used a measurement rule." It was just that "big leaguey."

Big-timer Jack W. Scharpf, Jr., directed the stunt events, and without a single complaint. Lloyd Wason managed combat—and what a time he had. The event followed the rainstorm, the asphalt was wet, the stream-

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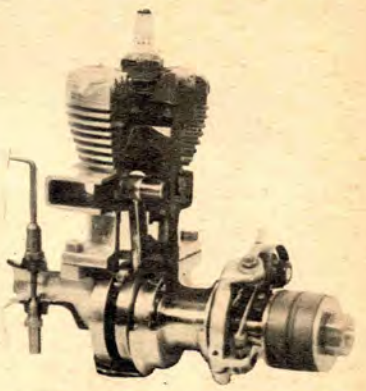

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ers were ruined the second they touched the surface. Resourceful Wason lined up helpers to hold the streamers up until the planes became airborne—just like train bearers at a wedding.

Yep, the rains came, but the life-saver during these two hours was Jim Walker. He kept the crowd happy with indoor exhibitions—what a guy. His Outdoor Exhibition thrilled the crowd!

George Perryman gives us his angles on the meet. He writes: "The free flight events pulled more entries than ever before in Southern flying history." A few ships were lost, many landed in a nearby jungle. The Half-A's were more than a match for their big brothers. Entry list was tops for, as George says, "everybody loves the little models."

Kenneth Grubbs, well-known Wakefield flyer, was on call from a nearby Army hospital. Stayed at the contest one hour between calls, but carted home second place in rubber, also carted away a $25 Savings Bond. Pretty good pay for an hour's work! Free flight gas pylon models were hashed and rehashed. Some really got hashed up brown on the concrete runways to disprove Newton's famous law that two bodies cannot occupy the same place at the same time!

George Perryman continues: "These Georgia thermals are out of this world . . . my Wakefield hit one from the ground up and went so high the dethermalizer kicked in and it took 5½ minutes for it to fall." Gable Ray of Smyrna got a tremendous altitude with his towline glider to win first in this event. Hard luck pursued many flyers. George Johnson got his share and then some. Some tried to squeeze out that last second and got over-runs, others forgot to light their fuses, and frequently the screaming wail of an engine and "heads up!" cries echoed o'er the field.

Timers were plentiful. No one had to wait—49 stop watches used and not one lost! Reason: we paid a young lady ten bucks to check in and check out the watches.

Herbert and Alfred Davis from Birmingham cashed in on the Savings Bond awards

(*Continued on page 72*)

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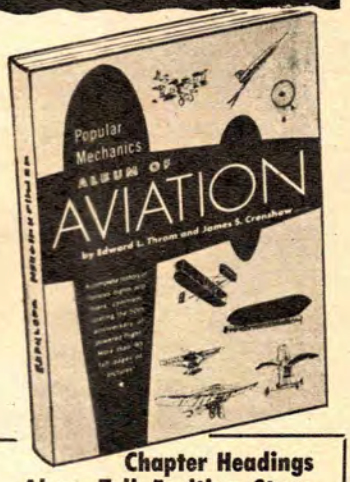

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This year in Air Progress the emphasis is on the airplane from the standpoint of the camera, whereas last year the major effort was by drawings. This does not mean that we're neglecting the talents of such outstanding aviation artists as Douglas Rolfe and Frank Tinsley in this country or the Das Brothers and Roy Cross in Europe, but it does allot more space to the photographer whose camera has recorded the birth of flight and all important planes and aeronautical happenings right up to the guided missile era . . . and, incidentally, you'll find interesting photos of **those** "birds" in flight! The contents of Air Progress is one of those you must see to appreciate . . . but to give you just a glimpse of what will be found between its covers here's a quick run-down on some of the scores of valuable features. Ask anyone who has a previous issue of Air Progress and you'll soon understand why no serious aviation fan, industry worker or future pilot can be without a personal copy!

JETS OF THE WORLD

FAMOUS PLANES OF THE JET AGE . . . that's what you'll find in the lead-off section of "A.P."—"Jet Aircraft of the World." More than one hundred photographs of operational and new jet powered planes from all the air nations. Along with these valuable photos are accurate three view drawings of American jets—latest models such as the Boeing Stratofortress B-52, Convair XF-102 and XF2Y-1 Sea Dart, Douglas XA3D-1 and F4D-1 Skyray, Lockheed F-94C Starfire, Republic RF-84F Thunderstreak, North American FJ-2 Fury II, Chance Vought Cutlass F7U-3.

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HIGHLIGHTS OF HISTORY

AUTHENTIC AVIATION HISTORY—recreated in written and photographic form; reenactments of the two most famous events in the air era: "First Flight by Man"—photographs of the Montgolfier Balloon, recreated in exact likeness of the 1783 craft, being prepared for flight and the first ascension of a human being in free flight! "He saw the Wrights Fly," a never-to-be-forgotten account of how a young lad met the Wright Brothers at Kitty Hawk, helped them prepare their original plane for flight and then was one of the fortunate few to witness the first powered flight by man!

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MINUTELY DETAILED CUTAWAY DRAWINGS . . . last year in Air Progress famous history-making planes were presented in authentic cutaway drawing form (the Wright plane, Bleriot, Spirit of St. Louis, etc.); this edition of Air Progress brings you right up to the minute with the unequalled detailed, skeletonized drawings by the world-famous Rudolf Das of the American Convairliner 340, the Fokker Mach Trainer (Holland's S-14), Britain's Vickers Supermarine Swift (Type 541)—and as a special highlight: the "inside" story in cutaway form of the Allison J-35 Turbojet engine!

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FIGHTERS—THEN AND NOW

For the first time an invaluable photographic comparison of a World War I Thomas Morse S-4C Scout and a contemporary Republic F-84F Thunderstreak. Similar flight shots and ground pictures show the vast changes that have been made in aerial attackers. You get all the details from the C-9 90 hp rotary LeRhone engine to the Wright 7,200 pound static thrust J-65 Sapphire power plant. A real "must" for every air fan!

ONE-OF-A-KIND AIRCRAFT

What do you know about the Crouch-Bolas or the Cairns Model A? Or the Hammond Y? Scores of little-known aircraft are covered in this amazing round-up. Here are just a few: Brown Young, Uppercu-Burnelli UB-20, Herrick HV-2A (a very important plane in the light of today's developments), Beco B-5, Lambert 1344, Stewart M-2, Continental GR-1, American Gyro Crusader AG-4A, and the Gwinn Aircar. Plus more, more, more.

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We've given you only a glimpse of the contents of the new Air Progress. We scarcely mentioned "Secrets of the Jap Air Force!" Or the "Saga of the Curtiss Hawks" (what do YOU know about the P-1, the AT-5, the F6C-3, the XP-3A, XF11C-1, etc., etc.—those and many more are shown in photo form). And then who could fail to thrill to Frank Tinsley's "Famous Firsts in Aviation" with text and drawings by the old master himself?

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AT 10-53

(Continued from page 69)

—there were $250 in bonds, plus trophies, loving cups, engines, and small-fry giveaways. These bonds were really a boon to the youngsters.

Bob Elliott retained his title in stunt with his original design Black Tiger, Berkeley's P.40 Warhawk.

In addition to which he placed in all speed events except Half-A to win the Open U-control High Point and the Rickenbacker Sportsmanship award.

Another Black Tiger in the hands of Walton Pyron took first in Junior stunt. Still another Tiger won second in Senior stunt, this flown by Harris Grimes. The youngest member of the Tiger family is Tom Aldred, Jr., 8 years old, member of the Flying Rebels from East Atlanta. He flew his first one at Greenville and will be readied to step into Pyron's shoes when Walton moves up into the senior division. The senior winner at the Southeasterns in stunt was Bill Hutchins from Spartanburg, S. C. A fine flyer and fine sportsman.

Fay Caton from Andalusia was the most feared man in the speed events. His engines were immaculate. Just happened that some breaks went against him. However, he was third in A open, first in B open; tied for third in C open and first in D open—the high man in speed!

The girls were there also. Barbara Bly from Orangeburg, S. C.; Evelyn Millican, Atlanta; Frances Strickland from Stone Mountain. Frances won the Monogram Models trophy for "best girl flyer" and also the big Herman L. Short Perpetual for "best beginner." She built a free flight one day, flew it the next, and copped first!

Big plans on foot for next year. New events as suggested by Jim Walker for the pre-freshmen and freshmen classes over a three or four day contest we believe will register 1,000 flyers! In advance we hope the City Recreation Department will adopt these events on their playground as a "build-up" for the contest.

George Perryman was chosen as one of the team members for the United States in the International Glider Contest held in

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WANTED—¾" and ½" Cleveland scale kits. Have cash, supplies or other kits, including over 100 Cleveland Masters for trade. W. H. Ostenberg, Box 801, Scottsbluff, Nebraska.

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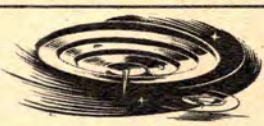
NEW  NEW

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with official insignia in Army olive drab, Navy blue, and Civilian red.

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You've been reading about these exciting helicopters for a long time – now you can own exact replicas, detail for detail. So real looking, you think they're about to take off. These models are precision molded of sturdy polystyrene plastic, and are handsomely gift-packaged with a dramatic color illustration, suitable for framing, on the box cover. Each easy-to-assemble kit contains a clear plastic display stand, instruction sheet, and a folder describing the fascinating history of the helicopter. These authentic models are a prize for any collection – get yours today! AVAILABLE AT YOUR DEALER and Fine Stores Everywhere, or write direct to us. Enclose check or M.O. plus 25c for postage and handling – no C.O.D.'s please. Specify model and color desired.

Helicopters for Industry Inc., 111 Cathedral Avenue, Hempstead, N. Y.

Yugoslavia.

The ship that he sent over for proxy flying was his latest version of a basic original design he has been toying with for years. Preceding the Internationals this ship had won 27 firsts. Has a six-foot span with polyhedral sweptback stabilizer.

Down Savannah way at Hunter Air Force Base, Col. Stockdale is the moving spirit, with Chuck Taylor his right-hand man. Hope you'll plan a big open meet next year. Colonel. A lot of us have never been to Savannah. We've read all about the beaches and the beauties, so all you have to do is to announce a model meet!

Flyers living in that particular section contact Savannah Hobbies, 249 Bull Street. Join their club, you'll be most welcome!

Newberry, S. C., just organizing the "Modeling Aces." Fly every Sunday afternoon at Newberry College. Beginners held a meet in August. President is Larry Monts. VP Olin Banks; Secretary-Treasurer, Kenneth Suits, and safety director, Leland Welling. Glad to have you over to the Southeasterns.

Now for a final quickie roundup. *Augusta, Ga.:* Way now open to work with the mayor in building a model flying field. *Moody Air Force Base, Valdosta, Ga.:* Hailing the arrival of Bryant Thompson, elongated red-topped veteran modeler. One of the best! *Atlanta:* Mary Katherine Bonavita, as attractive as her name sounds, was my shorthand girl Friday at the Southeasterns. *Naval Air Station, Atlanta:* Modelers never treated so royally as at the Southeasterns. Imagine kegs of ice water at the Free Flight and R/C areas! Executive Officer Dick Buckley, and Commanders Goshorn and Lampshire and Lt. Thurston perfect hosts. Commanding Officer Capt. Pickering now on the high seas. Another first! The Crosley Broadcasting Corporation presented Capt. Pickering a beautiful trophy for "outstanding public service to model aeronautics." Wherever the Captain is, he is sure of two companions—our best wishes and his excellent coffee!

—*R. H. Elliott, Box 5078, Atlanta, Ga.*

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BASIC KIT — best quality coil, condensers, resistors, socket, switch, jack, key, cable, chassis, etc. **$2.95**
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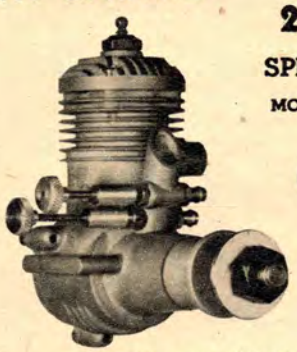
CAMERON

.19 ENGINE

2 SPEED MODEL



Only $11.95

The Cameron .19 L-2 Speed Engine is designed and built especially for use in radio control and other models where a 2 speed engine is desirable. It can be used the same as any conventional single speed engine and also gives the modeler the added advantage of being able to change the engine speed while the model is in flight.

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CAMERON PRECISION ENGINEERING CO.
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F84 THUNDERJET

(Solid Scale Model)

Scale: 1/8" to 1'
Wingspan: 5¾"
Length: 7¼"

all parts ready-shaped for quick assembly. Kit complete with full-color decals, plus canopy and display stand. 79¢

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Foreign News

(*Continued from page 66*)

pop-up stabilizer dethermalizer, a unique one-leg wire gear which attaches to the engine's radial mounting bolts; formers, ribs, etc. are lightened and most parts fit together by interlocking notches. Where in this country we might quickly shape a pylon of a single balsa sheet, the pylon of "Komar" is composed of a dozen sheet parts which interlock to form a light, streamlined structure. (Fig. 2)

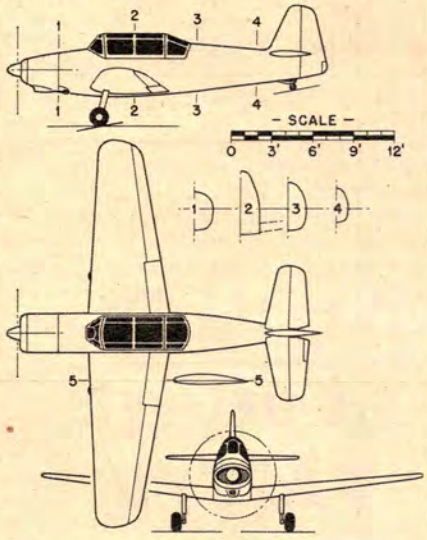
Among many unusual airfoil sections popular overseas, we select two which should prove interesting to original designers. The thin Benedek 6356, popular in Russia, is taken from the French Modele magazine. Another, the Joukowski, is similar to the familiar Eiffel 400 section and although thick is a relatively low drag profile. (Fig. 3)

Since its designer's name is Guiseppe Cargnelutti, this unusual Wakefield ship is obviously Italian, although described in a German publication. The fuselage is wider than it is deep and sharply undercambered wing has effect of washout in tips by use of 1" x 8" slats mounted beneath the trailing edges, toward tips, and rigged to shallow negative incidence. Note extreme rearward location of undercarriage. (Fig. 4)

Something new in glider design, backed up by winning performance, is the "Rekordmodell" by Dieter Hoffman of Germany. Of approximately 470 sq. in. wing area, the span is 60 inches and the fuselage nearly as long. The depressed nose boom with its small vertical vane is the original design touch. This vane appears to be approximately half the area of the inverted rear fin and has slightly more than half its moment arm. Cross-section requirements are met with the short central pod, a functional, squarish structure. Here is something worthy of investigation by American glider enthusiasts. (Fig. 5)

—H. A. THOMAS

Japanese TT-



This neat little low-wing airplane was built by Tokyo Aircraft Mfg. Co. for $1,100; two preproduction models made so far. First test flight took place December 30, 1952. Plane is powered by a 135 Lycoming engine, has a top speed of 147 mph, stall. speed 50 mph, range 475 mi.

Best Pictorial Coverage of the Nationals . . . Coming in November Issue of Air Trails

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Dope Can

(*Continued from page* 10)

emphasis on the service modeler.

Getcha Greenbacks, Guys. Air Trails is holding checks for Fred Pierce formerly of Cheney, Wash., and Lt. Bob Randolph formerly of Keesler AFB. We're asking both to contact us giving new and old addresses.

Cheers for Air National Guard. Too late to be included in the Contest Calendar came news of the Spokane Invitational meet on August 29-30. Co-sponsors were the Northwest Hobby Model Airplane Club and the 142d Fighter Interceptor Wing, Air National Guard. Special emphasis was placed on events for beginners. Capt. Robert F. King of the ANG and co-chairman of the contest committee arranged for all modelers to inspect Guard aircraft, sit in the cockpit of an F-84 "and play with the gadgets, but please, don't raise the landing gear!"

How about it—have you been overlooking the ANG as a possible co-sponsor of model events in your area?

Contest Calendar. "Please send form for announcement date of sanction notice for publication in your journal," requests Richard Merrill of Attleboro, Mass. Well, we just don't have any such forms, Dick. To get your contest listed in our competition announcements just have the sponsor or contest director write us well in advance of the meet . . . at least 90 days, more if possible.

To have your meet sanctioned write the A.M.A. in Washington for assistance.

America's International Teams. The U. S. Wakefield Team this year is comprised of Joseph Foster, San Jose, Calif., Carl Hermes, Arlington, Texas, George Reich, Plainview Village, Ohio, and Cliff Monplaisir, Exton, Pa. A distinguished group!

In the F.A.I. Gas competition America was represented by Stanley D. Hill, of Santa Barbara, Calif., David Kneeland, Hickman Hills, Mo., Joe Elgin, Cleveland, Ohio, and Carl Wheeley, Washington, D. C. All have held gas records, won important meets, or been on previous Wakefield teams. AT PRESS TIME WE LEARN KNEELAND WON THE EVENT! FLASH! FOSTER WINS WAKEFIELD CONTEST!

In the Nordic A/2 glider field Henri Dore and George Perryman entered towline gliders to be flown by proxies; Dick Everett was hopeful of competing in person.

Lo, the Sour Puss. Clarence Wells of the Bucks County, Pa., Federation of Model Clubs is up in arms against the sour-puss complainers who seem intent upon ruining every meet they attend. Herewith Wells: "A rehearsal meet was held at the Johnsville Naval Air Development Center for the Nats. This originally was to have been a Plymouth sponsored meet, but since the dealers in this area will have nothing to do any more with model aviation the BCF-MAC decided to run it off anyway. It was a

(*Continued on page* 78)

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See the complete line on display at all dealers. Tanks may be cemented into your plane, will not leak or the tubing shake loose.

Twenty eight different sizes from .14 oz. to 5.1 oz., 1-2 A to class D. Constructed completely of fuel proof brass.

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B Series	.75 ea.	M Series	1.00 ea.
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CURTISS P40F GAS MODEL

48" Span. Free flight or U Control

Improved with new 2¾" alum. spinner and 8" Veco alum. disk semi-pneumatic rubber wheels. Planked type body, parts printed on balsa, and all parts. Set $9.00

REPUBLIC P47D GAS MODEL

35¾" span, ⅞" scale. Length 30½". One-piece moulded, clear plexiglas cockpit enclosure. 2½" scale alum. disk rubber wheels. Body planking full size plans. Uses B or C motor. Set $5.95

9' TAYLOR CRAFT GAS MODEL

9 foot span. Can use Radio control. Set has 36 ready cut wing ribs, cut plywood body formers, 16" carved prop. tail wheel unit, 2 full size plans, printed balsa, silkspan, etc. Uses "C" type motor, single, twin, or 4 cyl. motor. Set without motor or wheels, postpaid..... $17.50

Extra pair of 4½" airwheels, $3.00

VOUGHT F2G GAS MODEL

41" span. U Control B or C Motor. Scale model of 1949 Thompson Trophy winner. Set has 2½" scale rubber tired alum. disk wheels 4¼" aluminum cowl, body planking, moulded, clear plexiglas cockpit enclosure, plastic spinner, etc. This is one of the finest equipped models in the world. Const. set..... $7.00

Elf 4-Cyl. Gas Motor

Elf ⅓ h.p. 4¼" wide. Price $49.50

Stearman PT17

Set has 2½" celluloid motor, plastic prop, etc. 23" span. Const. set $2.95

NEW FOKKER D-8 GAS MODEL

39" Span. 1½" Scale. Length 29".

U Control or free flight scale model. Very easy to build. Excellent flyer. Uses "B" or "C" type motor. Set has all parts printed on balsa, silkspan, wheels, full size drawing, and all parts. Dry set, less motor. $5.95

This model has sheet balsa covered body—almost unbreakable.

BOEING PT17 GAS MODEL

45" Span. Can use 5 cyl. M5 Motor to scale or B or C Type Motor. U Control.

Set has scale rubber wheels and all spec. parts, ready cut wing ribs, tail wheel unit and wheel. Const. set $9.95

CURTISS HAWK F11C4

32½" Span. Length 22¾". 1" Scale.

A real collector's item. Finely detailed. Set has air wheels, ready cut pants, turned balsa cowl unit, parts printed on balsa. Const. set..... $4.50

VOUGHT F4U5 NEW

41" span. 1" scale. Rubber driven. Standard set $4.95

De luxe set #2 with Veco scale wheels and alum. cowl $6.50

Grumman-F3F1

32" span. 1" scale. Const. set. Rubber driven...$3.75

N. American B-25

33⅛" span. ½" scale. Const. set. Rubber driven...$4.00
Gas model set.....$7.00

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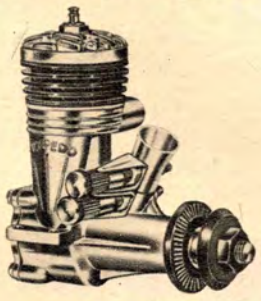
HENRY ENGINEERING CO. BURBANK CALIF.

The new Veco "Squaw" Control Line Kit now at your Dealers

TWO-SPEED TORPEDO .19



K & B establishes another first with the first two-speed glow ignition engine. This engine is equipped with two needle valves and is very practical for use where engine control is desired. Radio Control and other special events as the many carrier event is primarily the reason for the manufacture of this engine. Any reliable motor control unit may be used, however for radio control, K & B recommends the Bonner escapement shown on this page. The Torpedo .19 two-speed is available at your dealers $16.95

12 beautiful power boat construction kits —21" to 33½" length. $2.95 to $9.75. Write for free literature on boats, motors, fittings. At all hobby stores. Chris-Craft, Owens, Harbor, Vinyard, Colonial. Large boat construction from factory plans. U. S. A. and Armed Services only.

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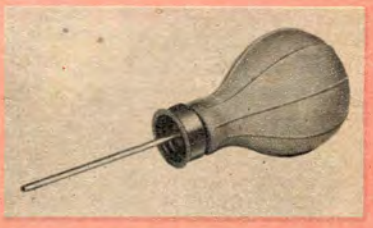
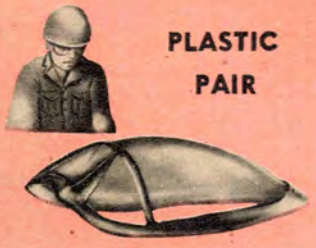
V-tailed stunter, the Stinger, from F&B Model Aircraft, is 4-foot-span job which flies on Class B-C-D engines. $6.50 kit includes rubber-tired wheels, bellcrank, control horns, aluminum landing gear and plastic bubble canopy. Engine is fully cowled. Design like Goodyear-Continental racer.

Rubber squeeze bulb pump is from Sullivan Products. In 2 oz. size it sells for 59¢; 4 oz. job is 69¢. Dent-proof polyethylene screw cap fits any standard fuel can. Tubing is made of corrosion-resistant aluminum. "Just squeeze the rubber tube and let nature take its course"—sez Mattie S.



SQUEEZE PLAY



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F.Z. FOR '53

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Complete kit, including machine carved hardwood hull, wood parts, castings, cordage, plans and instructions **$8.50**
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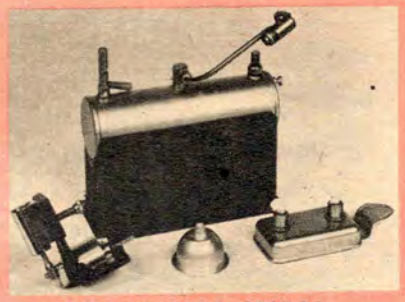
You'll want the 1953 International Competition Handbook with its 48 pages of rules, plans, special articles by top model aircrafters. All proceeds support Wakefield and FAI Gas Teams. At your dealer's for 35¢, or 50¢ by mail from Amer. Inter. Comm., Box 310, Rt. 1, Grays Lake, Illinois.



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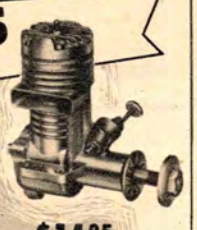

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Stroke — .600
Wt. — 4¾ oz.
Beam or Radial mounted.
2 speed optional.
Good idling characteristics.

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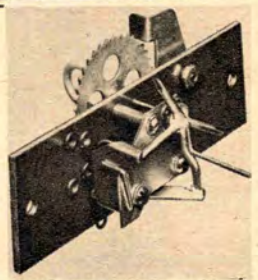
TOPS IN RADIO CONTROL



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A self neutralizing, four position, speed regulated control unit . . . No sequence to worry with! Practical, foolproof. Designed for operation with any single channel radio control while duplicating performance of three channel control. No extra batteries or channels needed.

Wt. 0.8 oz.—⅛ Rubber Drive.
3 V. Coil—1" x 3" Mtg. Plate

$14.95

Address all inquiries to
BONNER SPECIALTIES
2900 Tilden Avenue,
Los Angeles 64, Calif.

(Continued from page 75)

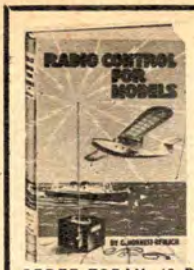
last minute affair, but a lot of hard work was put into it. Prizes were all donated by manufacturers. I realize that there is always a small handful of gripers to complain and sour things up; but this meet took the cake. To many there just wasn't anything that suited them. They complained that there weren't enough events, the officials were stupid, the organization was poor, the registration closed too early, the C.D. should drop dead, the stopwatches were wrong and the prizes stank. This led me to compose the following:

HOW TO ENSURE FEWER MEETS FOR '54

1. Complain about the events, tell the C.D. that he just doesn't know how to plan his schedule.
2. Cuss out the registrars because they shut up shop too soon.
3. Tell the timers they are a bunch of jokers and that they have everything fouled up. Be sure they understand that you can do better.
4. Find out who the sponsor is and tell him personally that this is absolutely the most awful meet you ever attended.
5. Wait until the prizes are awarded to bring up those protests you've been nursing along all day. This always looks good to the sponsor.
6. When you get your prize, snicker about it and yell, Who wants to buy this junk cheap? Be sure to tell the contest officials that the prizes are rotten and how much better they were at the other meet you attended last week.

"Thank heaven that these fellows are few. But there are always just enough to make people think all modelers are that way."

Straight Cash Prizes? That's what the flying Bisons (Buffalo's Miniature Aircraft Engineers) tried out for their free flight meet. The entry fee of $1 per event and 50c for



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THE FIRST MAJOR CHANGE IN BATTERY CASES IN YEARS

ACME now makes a complete line of high quality battery cases. We have designed a battery case for just about every battery need. For Radio Control, Motor Boats, Cars, etc.

For 1 Cell 20c ea.
For 2 Cells 40c ea.
For 3 Cells 60c ea.
For 4 Cells 75c ea.

These prices are for either the new miniature pencell or regular penlite size.

Illustration shows a single and a double battery case for the new miniature pencells such as the Burgess #7.

NOTE: Insulation and solder lugs at both ends for each battery. These battery cases are made for 1-2-3 or 4 cells supplying from 1½ to 6 volts as needed. They may be wired in series or parallel giving you desired voltages.

But Look! Here Is More

Here is the big news—Battery Cases to hold 22½ volt batteries, such as the Burgess U-15. Radio control fliers have acclaimed these battery cases the greatest thing since R.C. started.

Made in 2 Sizes
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In addition, we have made high quality battery cases for one or two medium or large standard flashlight batteries.

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If your dealer does not stock Acme Products Order Direct
DEALERS—JOBBERS—ORDER NOW

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33 1/3% TRADE IN ALLOW.

1. 33 1/3% Trade in allowance on any used engine toward the purchase of any new engine. Check, money order or COD.
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An easy-building, sweet flying ½A trainer that has become America's favorite. Takes any engine from .020 to .074 cu. ins. All balsa SIMPLIKIT construction.

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Compare *Allyn* models and see the difference. Only *Allyn* plastic model planes have that smooth finished look. Built true to scale and color of actual planes, complete with decals of insignia and consistent in quality — *Allyn's* is the best and most authentic plastic model kit you can buy. Compare and see the difference.

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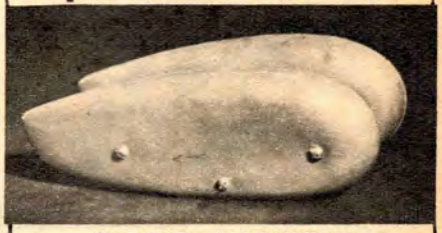

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AIR TRAILS Hobby Shop Directory

Model Builders! Here's a listing of the nation's leading hobby shops. You'll want to file it away—and when you're in the neighborhood, drop in and browse around. They're expecting you.

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Complete model supplies
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Motors
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Model Planes, Trains, Race Cars, Motors and Motor Parts.
Boat & Ship Models, Balsa Wood.
10:30 to 7 P.M. Daily

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KENTUCKY—LOUISVILLE

Model Airplanes—Motors—Race Cars & Supplies. Complete Parts Service. Repair shop with South Bend Lathe.

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618 S. Fourth Clay 3213

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Model planes, motors, railroads, ships and accessories.

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South East Missouri's Finest

Hobby Center

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HOURS: 11 a.m. to 8 p.m. daily
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Complete stock of model airplanes, engines, parts, accessories, etc.
Also ships—trains—autos—crafts

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10 to 6 p.m. W. F. to 9 p.m.
Home of the Seattle Sky Hawks

BUZZ & DOUG'S HOBBY SHOP

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hand-launched glider may sound stiff, but there seemed no reluctance on anyone's part to pay that amount since it went right back into prizes which were $10 for first, $7 for second and $4 for a third place in three classes of gas, rubber and towline glider and $5, $3 and $2 for hand-launched glider. The meet was financed through donations, entry fees and the club treasury.

Everything went well except that the wind blew about 25 mph all day, Don Hobel reported. It was a 10:15 to 5 affair with sufficient timers at all times. Prizes were handed out promptly at 5:30.

On a 10-second engine run for hand launched and 15 for ROG the winners were: Half-A—C. Hutcheon, 3:51; Class A—P. Evans, 6:09; Class B-C—C. Hutcheon, 3:05; Rubber—L. Kleiman, 4:39; Towline glider—L. Potter, 5:20; and Hand launched gilder—E. Jordan, 2:36.

We'd like to know of the feelings of contestants who have competed in other cash-award contests.

Seabee Search. Bob Lang came back from Korea with one big idea in mind—to build a Cleveland Seabee. You know what—right! —no plans, no kit available. Can anyone help? It's the Cleveland Master Kit 28" Republic Seabee hez after. Kit or just the plans. It's S/Sgt. Robert A. Lang, Marine Barracks, U. S. Naval Base, Philadelphia 12, Pa.

He Says We're No. 1. Chicago is to have a new and diversified Hobby Show at the Coliseum next February known as the "Hobby Show Unlimited" according to Marcus W. Hinson, exposition manager. Mr. Hinson says, "Special features will be presented in connection with the most popular hobbies, which are, in the order of their popularity: Model Airplanes, Photography, Stamp Collecting, Needle Craft, Scale Model

NOW... Complete

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27mc. Crystal Control

"SUPER AEROTROL"

NO OPERATORS LICENSE REQUIRED!

ONLY $49.95

Including:

TRANSMITTER; ANTENNA; RECEIVER; ESCAPEMENT; & O-3 MILLIAMMETER

Yes, you can now save over $7.00 on this combination deal. Nothing else to buy except batteries . . .

"Super Aerotrol" 27mc. Crystal Controlled

TRANSMITTER

—Operate and Maintain Yourself!

• Portable — Self contained — No separate antenna — No external Batteries! 3.5 lbs.

ASSEMBLED UNIT $27.95

With tube — less batteries

IN KIT FORM:

Kit includes all necessary parts (except tube and batteries): Precision Ground Crystal; Painted Metal Cabinet; Finished Sectional Antenna; stamped and formed chassis with all holes punched; all necessary components, resistors, condensors, coils and chokes; color coded wiring. Can be assembled in less than two hours. Complete building and operating instructions are included.

$19.95

"Super Aerotrol" Dust Core Tuned RECEIVER

Super-regenerator circuit, 100% dependable.
• NEW "locked-channel" dust-core tuning.
• Light in Weight, 2¾ oz. less batteries.

ASSEMBLED UNIT With tube — less batteries **$21.95**

IN KIT FORM: less tube **$13.95**

Kit includes: Finished, tested sensitive relay; finished dust-core tuner; drilled bakelite base with condensors and eyelets attached; all electrical components, condensors, resistors, coils, chokes and potentiometer; all necessary contacts, and color-coded wiring. Can be assembled in less than two hours. Complete building and operating instructions are included.

"Super Aerotrol" ESCAPEMENT

Assembled only **$3.95**

Entirely new and different! Rugged yet compact. Single hole mount. Draws 2-5 times less current. Operated by rubber power, it will deliver at least twice the control operating force of other escapements without "skipping." Completely self-neutralizing, it returns the control to neutral after the signal stops.

MILLIAMMETERS

0-3 Milliammeter $3.50

0-50 Milliammeter 2.75

Low in cost, manufactured specifically for use with Super Aerotrol. O-3 Milliameter for use with Super Aerotrol Receiver. O-50 Milliameter for use with Transmitter.

XFG-1 RECEIVER TUBE.....$3.50

3A5 TRANSMITTER TUBE 2.25

"Super Aerotrol" INSTRUCTION MANUAL

This is the best book on Radio Control. Included at no charge with Transmitter. Sold separately, only **$1.00**

D-E AEROTROL (52mc.) Kit...$22.95

Includes Transmitter, Receiver, Escapement (less batteries and tubes).

Prices and Specifications subject to change.

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DEALERS & DISTRIBUTORS

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. AT., West Hempstead, N. Y. Please include 25¢ packing & postage.

Antique Vehicles, Pre-sketched oil painting sets, Leather craft, Model railroads, Flower craft and Scale model ships."

Horray for our side. Number one, hey? Well, now, men, let's hold our heads high, chest out, that's it, that's it . . . don't forget, NUMBER ONE!

Gen. on Jets. General Electric's Aircraft Gas Turbine has prepared a slick little booklet called "Jet Horizons" that's yours for the asking and mighty helpful. It's a story of jet propulsion and its possible effect on the aviation industry of the future. In diagram form explains how jet engines work, various types, and so on. Ask for your copy from GE's New Bureau, 1 River Road, Schenectady 5, N. Y.

Why Contests? Last month we mentioned the AMA's new helpful compilation, "Organizing a Contest." A number of major phases are covered. We find such sections as "Organizing," "Finance Committee," "Promotion Committee," "Operations Committee," "Running the Contest," "A Few Days Before," "Evening Before," "Day of the Contest."

Now all of this is very good and very necessary. But obviously this material has been prepared for folks who already know they want to run a meet. But what about material for people who can't decide whether or not they should hold a meet? And some basic answers to: What good are model meets anyway?

After viewing hundreds and hundreds of contests—and that is a great many over more years than we like to admit—we sometimes wonder if sponsors and meet officials know why they are running a competition. It's a fact—on many occasions it appeared the contest officials were more unhappy about the events than some of the contestants.

Contests should be "happy times"—if not, why should modelers torture themselves by entering and contest personnel grow gray? If you don't have fun at a meet obviously you don't belong there and there is no point in going. Same thing applies to event directors, timers, processors, registrants and so on. If they're not enjoying themselves nobody is going to have a good time.

You probably can recall two radically different types of contests. At one everybody seemed upset, standings were in doubt, prizes were not awarded properly and so on down the line. At the other affair contestants helped one another, prize winners were cheered, a contented group of flyers gathered around the director after everything ended to tell him they'd sure enjoyed themselves.

What is responsible for the difference in these meets? What did Group A do wrong —Group B do right? Was it the type of prizes handed out? The flying site itself? The weather? How can you be sure your club or your sponsor ends up with a "happy" meet?

Mostly, we think it is in the reasoning behind a contest—the "why" of affair. The local Lions Club, let us say, knows of your model group, seems to realize that here is an activity that's good for the participants, good for the community and good for the country. Eventually your club teams up with the Lions to put on a meet. How do you produce a happy meet—you and the Lions? Here are a few suggestions:

A. Know why you're putting on the contest. Make sure one important reason is to recognize and reward outstanding model-plane talent and provide a pleasant experience for all contenders—winners or not.

B. Put the contestant *first* in your thoughts; your MAC, the Lions and hizzoner the Mayor should be secondary.

C. Don't set up any more events than you can handle comfortably. Better for the few sour pusses to gripe over too few events than to have everybody unhappy because of too few timers and prizes.

D. Announce your prizes in advance; don't gild them if they are modest. Best to so state. Then the hardware hounds will steer clear and you'll get the genuinely interested group.

E. Try to give everybody a fair shake; get yourself a contest committee to handle matters of policy. It's hard for one man to make all the right decisions during the heat of battle.

—THE DOPESTER

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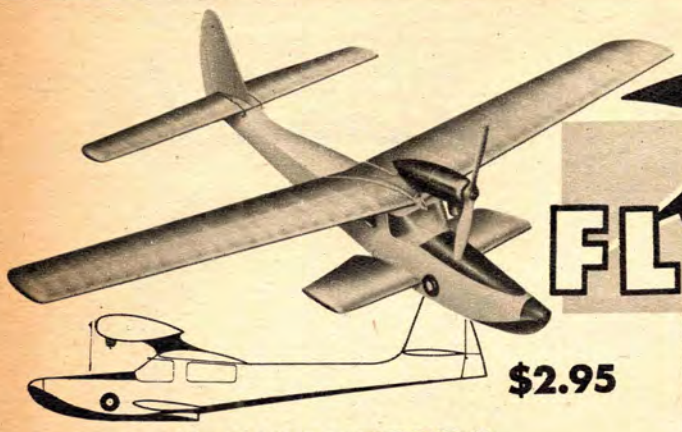

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with N.A.C.A. Long Planing Hull

For .035 to .074 Engines — 36" Wingspan

The N.A.C.A. "Long Planing Hull" design insures perfect water take-offs. Less than 15 foot run with an .035. All metal nacele and motor mount. All balsa die-cut fuselage; dummy wheels; die-cut celluloid; full size plans.

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Variable Camber Wing for Two-Speed Radio Control Flying

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Deluxe Advance Design for New Wakefield Rules!

51" Wingspan — 210 Sq. " Wing Area — 8.113 Oz. Total Wgt.

Designed by Henry Struck in the fine tradition of his famous "Flying Cloud," this new model is the culmination of 15 years of test research on Wakefield models. It has been designed for maximum performance under the new Wakefield rules.

Specially selected Balsa throughout; special Hardware for the Folding Propeller; Milled-Shape Balsa Propeller Blank; Covering Materials; and extra-complete Plans and Instructions.

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For .14 to .36 Engines — 28" Wingspan

$5.95

This Continental Trophy winner makes a perfect 1½" scale controline model. The kit includes genuine Jim Walker "U-Control"; metal hardware; formed metal wheel pants; metal spinner; formed sheet metal landing gear; metal bushed rubber wheels; die-cut balsa; plastic bubble canopy; fuelproof decals; hardwood mounts; die-cut plywood; covering material; full size detailed plans.

Cessna L-19 "BIRD DOG" $2.95

For Free-Flight Gas — Controline — Rubber Power

.035 to .049 Engines for Free-Flight .049 to .099 Engines for Controline

In active duty in Korea, this new liaison plane is perfect in proportions for model work. Plans show it as a free-flight "½A" gas, with details for rubber and controline conversion. Fuelproof decals, die-cut balsa, plywood and celluloid; shaped and notched wing edges; formed gear, etc.

SEMI-SCALE STUNT "P-40 WARHAWK"

with Metal Cowl, Stunt Flaps, Flying Tiger Decals . . .

For .19 to .36 Engines — 45" Wingspan

This beautiful semi-scale stunt controline won first in Open and first in Senior at the Tangerine Internationals. Die-cut balsa; silk-screened celluloid canopy; complete metal hardware including Jim Walker "U-Control"; metal cowl; fuelproof Flying Tiger decals; stunt flaps.

$4.95

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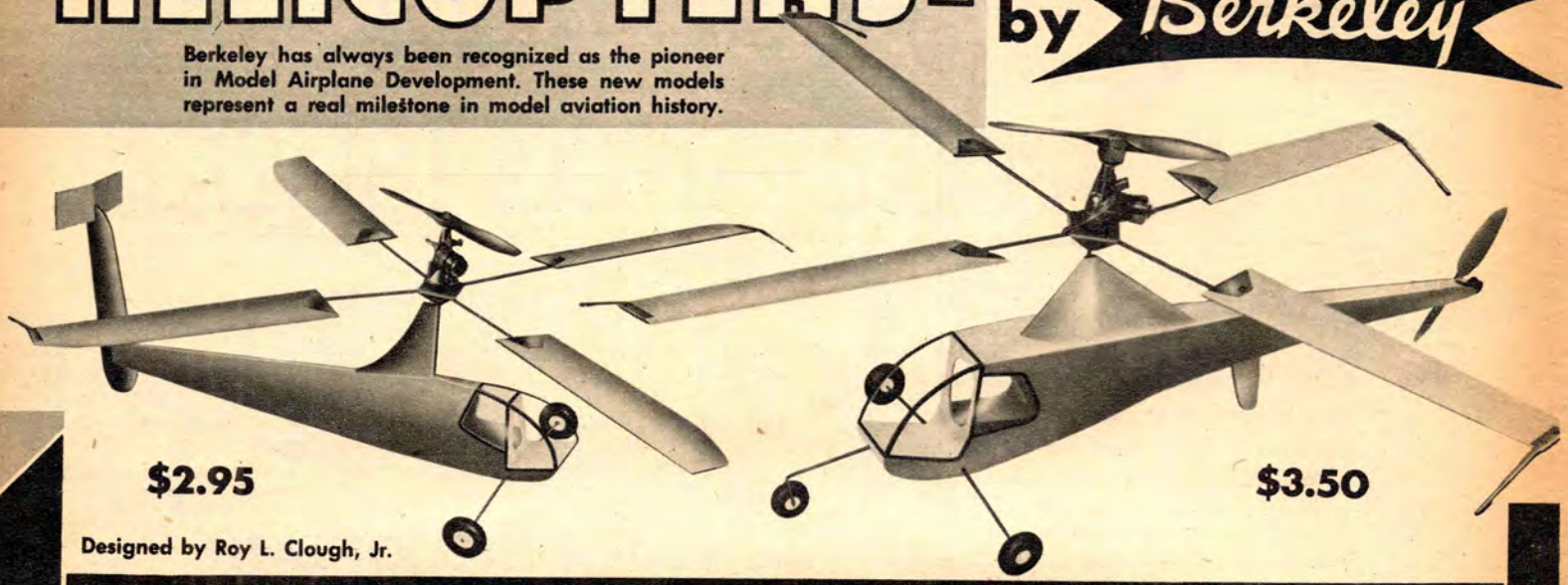
CLIMB VERTICALLY - HOVER - FLY FORWARD & BACKWARD -

HELICOPTERS - by Berkeley

Berkeley has always been recognized as the pioneer in Model Airplane Development. These new models represent a real milestone in model aviation history.



$2.95

$3.50

Designed by Roy L. Clough, Jr.

CLOUD-COPTER "D"
with Fixed Drogue Tail
For .045 to .074 Engines — 26" Rotor Span

CLOUD-COPTER "TR"
with Adjustable Pitch Tail Rotor
For .045 to .074 Engines — 25" Rotor Span

Here is a real advance in model flying. So new and different that the performance is almost unbelievable. You can actually adjust a "CLOUD-COPTER" to hover, fly forward or backward and even spiral climb like a conventional gas model. Fully automatic Cyclic and Collective Pitch Vanes, as on full-scale helicopters, permit the rotor to continue in the same direction after the engine stops. "CLOUD-COPTERS" are quickly built from our highly prefabricated kits.

EACH "CLOUD-COPTER" KIT CONTAINS:

Complete Metal Rotor Mast Assembly; Metal Blade Holders designed for quick replacement of blades; Metal Blade Balance; Engine Shock Mount; Shaped Rotor Blades; Die-Cut Sheet Balsa fuselage; Wheels; Die-cut Celluloid Windshield.

CHAMPIONSHIP "1/2" FLYING SCALE FIRST AT '53 NATIONALS

These full One-Inch Scale models have been designed for free-flight flying, and have proven themselves on the contest field. .035 to .049 engines, CO_2 or rubber power is suitable. For controline conversion, .049 to .099 engines are advised. Die-cut balsa parts.

"FAIRCHILD" FIRST IN OPEN

$1.95

CULVER "V"
29" Wingspan

This low-wing sport plane turns in long stable flights. The tricycle landing gear adds realism to landings.

$1.95

INTERSTATE CADET
35" Wingspan

A nine minute single flight at the 1951 Dallas Nationals is the best measure of this model — a 3 time Nationals Winner!

$1.95

PIPER SUPER CRUISER
35½" Wingspan

This model won 1st place in the Open division at the 1952 Los Alimitos Nationals. Plans show pontoon details. Wheels in kit.

$1.95

STINSON SENTINEL "L-5"
33½" Wingspan

This model is a consistant winner at National Meets. It is a commercial version of the Army's "Flying Jeep."

$1.95

STINSON VOYAGER "150"
34" Wingspan

Equipped with wing slots, this authentically detailed model flys with the best. Designs in this series have been chosen for performance.

$1.95

FAIRCHILD 24 "RANCHER"
36½" Wingspan

Largest in the series is the never to be forgotten Fairchild. Stable, strong, detailed, it is ideal for contest experimentation.

AERONCA SEDAN
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Featured as a landplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular.

CESSNA "140"
33" Wingspan

$1.95 The clean lines and stable plan form of the Cessna make it ideal for "½ A" or rubber power. Contest potentialities are unlimited.

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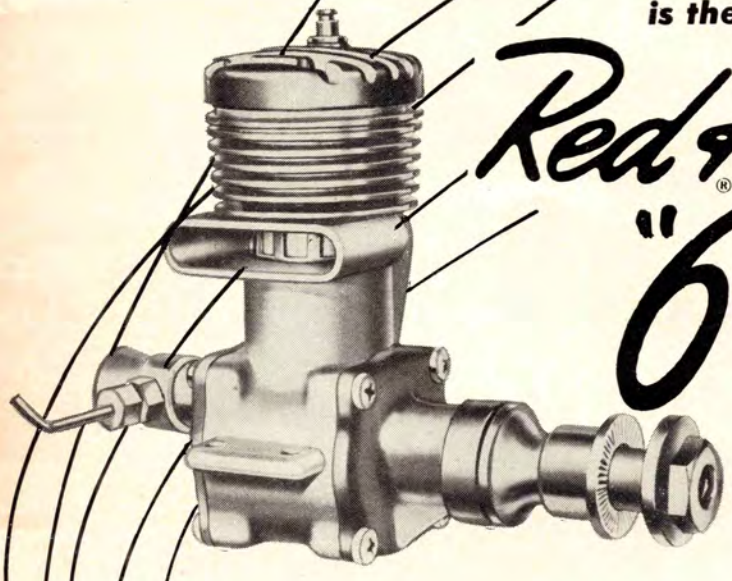
THE SKY'S FULL OF McCOYS!

...and hottest of all is the invincible

Red Head® "60"



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- New high compression head for advanced fuels.
- Integral parts of every McCoy are made in our own factory. Every engine meets exacting trials before shipment.
- Aluminum piston, two rings, fitted to honed sleeves. Crankshafts are hardened and ground to precision tolerances.
- Sleeve bore is broached and honed on micromatic hone for perfect fit.

ENGINE SPECIFICATIONS

Bore	.940"
Stroke	.875"
Displacement	.6072"
Weight in ounces	13.5
H. P. Rating	1.32 at 17,000

For meteoric speed, look to the McCoy Red Head "60," Series 20 ...again in production.

Redesigned, the *new, improved* "60" has features that prove it more remarkable than ever. Special alloy pistons for maximum performance on modern nitrated fuels. Matched outboard and front plate bearings, precision construction, power packed. No wonder it is known as the "world's fastest racing engine." Class D winners want the 60...you'll want it too.

Glo-ignition **$22.50**

A WINNER

McCOY Red Head "29"!

The most popular among racing engines, completely new. You'll thrill to its great performance. New, larger by-pass area, hardened steel sleeves, steel shimmed rotor valve, with front plate and two ball bearings. A honey...

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OTHER FAMOUS McCOYS — *Look over these three McCoy precision built engines...* McCOY "9" *at* $7.95; McCOY "19" *at* $9.95; McCOY "29" *at* $11.95 — *three models that are among America's most popular with beginners and veteran fliers alike. All with diamond-tooled finish pistons, hardened steel sleeves and trouble free front rotor. Your hobby shop has a complete line of McCoy engines.*

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Your hobby shop has them. Hot-Point has special iridium platinum element; develops more RPM than any other glow-plug tested. Pressure resisting up to 1800 p.s.i. **65¢**

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SERIES OF DIESEL ENGINES!

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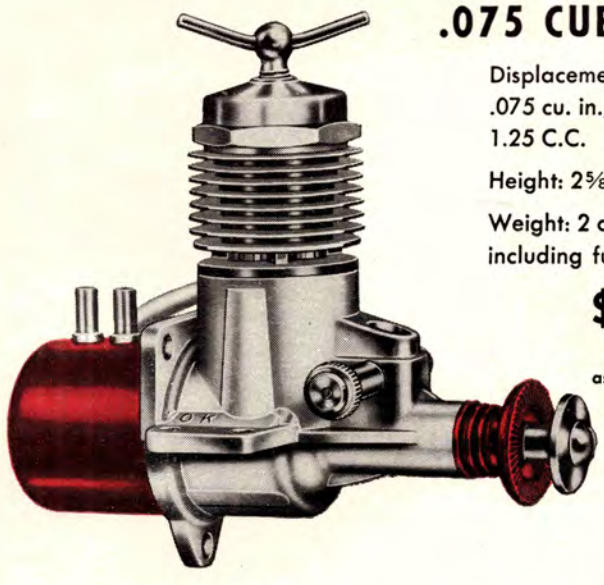

.075 CUB DIESEL

Displacement
.075 cu. in., or
1.25 C.C.

Height: 2⅝ in.

Weight: 2 oz.
including fuel tank

$7.50
as illustrated

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The age of the diesel is definitely here. Model enthusiasts everywhere are demanding them. Demanding diesel simplicity and lightness. But they're also demanding high power/weight ratio . . . easy starts . . . dependable flight performance . . . and reasonable cost. Factors that only high-precision, mass-production machinery, and skilled engineering can produce.

Herkimer "OK" Cub Diesels Supply The Demand for Finer Diesel Power-Plants

Herkimer's modern, high-precision, mass-output plant is ideally suited to supply today's demand for a finer diesel power-plant. Engineered, machined and inspected with the exacting thoroughness of modern automotive and aircraft production practice, Herkimer "OK" Cub Diesels out-climb, out-fly and out-perform any other diesel — imported or domestic — in the miniature engine field. The power/weight ratio is exceptionally high. They're easy to start. The adjustable-compression heads allow adjustment to local conditions and altitude. That means quicker firing, more complete combustion, more power at the top of the stroke, and cleaner scavenging. And the price is right for the popular pocketbook.

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